The Builder.

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Infanticide without Intention.

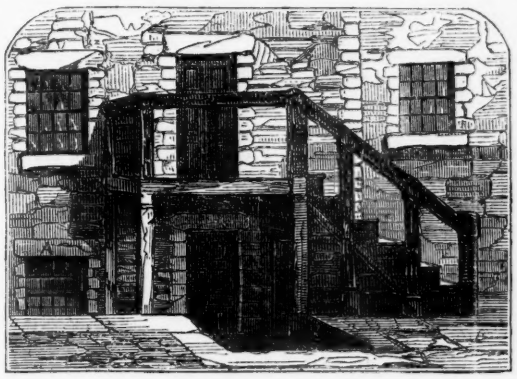
MURDER has been classed amongst the *fine* arts, *coarse* as a good deal of it no doubt is in practice. There are many ways of getting rid of *surplus* infants. It is not merely by cutting the throats of the poor little innocents as if they were pigs, or by drowning them as if they were kittens, that thousands of infant-murders are effected. In China they go about it in a more matter-of-fact and business-like way than we do; but throwing them in heaps alive within the precincts of a devil's temple, there to perish, does not come up to our more refined and civilized and varied modes of doing the Malthusianly needful work. And, in speaking of refined and civilized operations of the sort, we do not simply mean to refer to reiterated doses of "quietness" and such like; nor even to ingenious processes such as that of the talented individual who got rid of five of his superfluous progeny by various artful dodges, such as setting a tub of water, like a trap, over night for the unprotected little one to roll into out of bed, when all were asleep, and when no one, therefore, was to blame. Perhaps the method most entitling infanticide to be regarded as a branch (we wish we could call it a dead branch) of the fine arts, is to choke them by degrees, from short supplies of vital air, in close apartments. This is a much more safe and artful way of "keeping down the population" than either smothering them in bed, dosing them with laudanum, or even stuffing them with "strong meat" in the place of milk.

The public make a tremendous outcry when some poor "unfortunate" young woman has been driven, by the force of public indignation, to cast her little one into a pond or a river; especially if the outcast excite the public indignation still farther by failing at the same time to commit self-murder; but how serenely the public contemplate that wholesale infanticide which disposes of 40 to 45 children out of *every* 100 before they are five years old! There are Malthusian philanthropists who wink at even such a state of matters; arguing that "it is a providential mercy that so many children die; because, if all the children of the poor lived, the poor-rates required for their maintenance would be increased by two-fifths and even more;" and were not this a complete *non sequitur*, of course there would be a good deal of truth in it; but, unfortunately for the force of this Malthusian argument, wholesale death implies wholesale sickness and want of stamina in infancy; and foundations so weak are reared into frames so shaky that poor-law burdens must be immensely augmented, in place of diminished at all, by a high rate of infant mortality. Moreover, in a limited island space such as that of Great Britain, the true greatness of the nation, and its ability to sustain its poor, could not but be vastly increased, were the foundations of being well and securely laid by improved arrangements promotive of health and vigour, so as to raise the stamina of its manhood to a higher pitch than anything like what we have yet to boast of. And it is not the improved *physique* of the matured infant alone that would thus be realized; but the fact that vigorous parents lead to a vigorous progeny is no less obvious; and thus the nation would improve, physically speaking, in an accelerated ratio, were more care and attention given to the rearing of infants.

Of such vast importance, indeed, are the care and proper management of infant life; and at present so excessive and avoidable is its destruction; that we have frequently felt it a duty to call attention to the carelessness, ignorance, and too often wickedness, which destroy thousands during the first dawning of their existence.

On the Bridge of Life—which is described in that beautiful and physiological allegory, "The Vision of Mirza," are shown, in the early stages of the bridge, many rents and pitfalls through which multitudes of passengers drop, and rapidly disappear in the waters beneath, which flow darkly along. Towards the middle the danger is lessened, and a powerful and compact band move steadily onwards, with comparatively small loss, until the middle of the bridge is gained, when the dangerous pitfalls increase again in number, so that only two or three solitary pilgrims are left at the further end, who also disappear. Such is the general rule of life: the weak and tender infant is subject to injury from the slightest causes: it can be easily suffocated, as by bed-clothes, or even while in the nurse's arms. Its life is extinguished by unwholsome air; and by those numerous neglects to which we have referred in other papers. But admitting—as we are not inclined to admit—that, in passing the first arches of the bridge of life, there must naturally and necessarily be more deaths than towards the second and middle stages of the journey; still, there can be no doubt that by preventable causes, in the present conditions of society in this country, more than twice as many deaths happen as ought, with proper arrangements, really to occur.

The Privy Council, impressed with this fact and the need of its amendment, have appointed medical men of experience to make inquiry into this most important subject; and Dr. Greenhow, one of this staff, remarks, that in the manufacturing districts he frequently found, on questioning married factory women, that two-thirds or three-fourths of the children born to them have died in infancy: they are deprived of the warmth of their mothers' bosoms; left to the care of strangers; fed on unsuitable food; and, when they dwindle and become fractious, are drugged with opiates; for those who have to work by day cannot do so if they are disturbed at night. One druggist alone, a member of the Nottingham Town Council, states that he sells about 400 gallons of laudanum annually, at least one half of which he believes to be administered to infants. Dr. Greenhow notices the grievous extent to which parents, who intrust the management of children so largely to strangers, get demoralized towards their offspring; becoming more or less indifferent about them. As so many children die, the mothers become familiarized with the fact, and speak of the death of their children with a degree of nonchalance rarely met with amongst women who devote themselves mainly to the care of their offspring.



AN INFANT NURSERY: DAMP, UNDRAINED, AND ILL-LIGHTED.

Mr. Simon, in presenting his report to the Privy Council, observes, that such a picture of suffering and demoralization is very sad. The poor factory woman, who meant only to sell her honest industry, gradually finds that she has sold everything which other women understand as happiness. The law cannot reach the evil; but he suggests, with reference to one part of it, that masters might establish within their own factories, under well-advised regulations, nursery rooms, where working mothers might leave their infants in some proper and kindly charge, and might, as often as necessary, have access to them. This is a good suggestion, and would prove of decided advantage, if it could be carried out. We know the evil conditions of infant nurseries in the manufacturing districts, where female labour is largely in demand. In many instances the infants are left for hours together in the charge of other children not much bigger than themselves. We have often met with rooms, the doors of which are kept locked during the long absence of the mother, for the purpose of preventing the children from falling into the gutter, or being lost, or run over. There is a kind of infant nursery, however, presided over by imbecile and often cross old women, who, in their own youth, had never been accustomed to the proper care of children: these often inhabit unventilated and unwholesome rooms in undrained houses; and, from morning till night, in too many instances, as well as from night till morning, the little creatures are stupefied by the administration of "quietness," as they call the laudanum and other narcotic mixtures administered to children who are fretful. We have sketched one of these nurseries, outside and in, just as we saw it;—A showing the entrance door and the only window. It is not far from Manchester; half underground and wholly damp and unfit. The majority of the children had been "quieted." We all know, in respect of potatoes, what sort of growth takes place in a cellar,

From these dismal pictures let us turn to more pleasant prospects;—to large well-ventilated rooms, arranged with the greatest neatness; an even temperament, winter and summer; snug little beds ranged around, with sheets of snowy whiteness; a play-place of soft felt or carpet, with toys in the centre; intelligent attendants; baths; wholesome food, and other accommodations; while the charge made to mothers for all this is small, not exceeding, if we take one thing with another, the cost of the mismanagement of the old women. And yet, we regret to say, the latter and their dingy dens are better liked, by a great majority of the persons to whom good infant nurseries would prove beneficial, than places such as we have described, and which are patterns of order, and provided with all that is essential to health.

A certain number of poor persons, who have more than the usual share of the intelligence of their class, have sent their children to the infant nurseries which have been opened in some parts of the metropolis and also in the large towns; but we are sorry to say this institution has not as yet spread to the extent to which

we some time since were hopeful that it would. During the existing prevalence of distress in the northern districts; when it is likely that, for a time, large numbers of young women will be brought into rooms and employed at needlework; and will, at the same time, be put through a course of instruction; we trust that this charitable arrangement, which has been the result of a great calamity, may prove, to a certain extent, a benefit; particularly if means be used to diffuse a knowledge of the laws of health, and to show to the workers who are verging on womanhood the advantages that would result from placing their infants under proper care; away from the chance of the administration of laudanum and other poisons of a similar nature; and where they will not be injured by the foul, close air of the rooms in which too often delicate infants are kept in dirt and neglect.

Homes for pauper children are advocated by a member of the Ladies' Sanitary Association, in a tract issued by that association,* and which merits extensive circulation. It is proposed that these homes should simply consist of improved arrangements, at the cost and under the authority of the poor-law guardians, carried out in each parish or union. Such homes, it is suggested, would also serve as schools in which nurses, pupil teachers, school-mistresses, governesses, adult girls, and young mothers of any class could learn the best mode of practically managing infants and little children, so far as regards their physical well-being. There might thus be obtained fees to increase the funds applicable to such homes; which, moreover, would not, it is believed, cost more than pauper infants and children cost the guardians and the ratepayers under the present *system*—if we can so call it.

The subject of children's hospitals is one on which we must say a few words ere we close our present remarks.

It is a frightful circumstance that the mortality of children under ten years of age is only 2 per cent. less than it was fifty years ago;—so that, of 50,000 persons, for example, dying annually in London, 21,000 are children under that age. Notwithstanding the immense extent of sickness which must have preceded this multitude of deaths, there is no adequate accommodation in the London hospitals for sick children. We have no note of how the case may stand now; but, in January, 1843, of 2,363 patients in all the hospitals, only *twenty-six were children under ten;* and it is probable that the case is even now not much better. In these hospitals, the medical students have every opportunity of studying many phases of disease; but medical knowledge respecting children's complaints is particularly defective, owing to the want of sufficient opportunities for their study. In consequence of the great need of such an establishment, some earnest persons, by means of great exertions, succeeded in opening an hospital for children in Great Ormond-street. During the first five years of the existence of this valuable institution, the number of patients receiving advice and medicine was,—In-patients, 1,158; out-patients, 30,304; while, during the second five years, the number has been,—in-patients, 1,920; out-patients, 76,602. The number of out-patients who were admitted into the hospital between January 1st and December 31st, 1861, was 10,772.

In this list of cases there were 21 under one month old; and the sickness increases until we find 1,314 of the age of three years. The largest amount of illness is stated in the classified list to be from diseases of the skin (1,203): next come catarrh and cough (1,055); diarrhœa (970); rickets (852); hooping-cough (730): of typhoid fever there are 42 cases; diphtheria, 16; ague, only 1. It would be difficult to give a view of the extent of the success which has attended the treatment of this multitude of patients; but from the account of the 577 children who, in the course of 1861, were admitted into the hospital, we may state, though we cannot give the whole list, that from typhoid fever, out of 12 males and 12 females who were admitted, there was only one death: of the 15 cases of diphtheria, 12 died: from hooping-cough, out of 16 males and 13 females there were 11 deaths: from inflammation of the lungs and air-passages, out of 16 males and 13 females, there were 11 deaths: from debility and atrophy, out of 26 males and 25 females, there was only 1 death. The total of in-patients this year is 308 males and 269 females,—in all 577: of these 60 died; and, when we consider that only extreme cases are admitted, this seems to be a very small proportion in comparison with the fatal results which would probably have occurred if the children had been left in their own homes.

It is evident that the treatment of such a large amount of varied disease must afford an opportunity for acquiring much valuable experience; and it is satisfactory to know that, besides the benefits which have been conferred on the patients, it is made further useful; for, during three years, the experience and knowledge of the medical officers have been rendered available to the profession by a series of lectures given by the former during each winter at the hospital.

The nurses of this hospital are under the same authority and subjected to the same regulations as other nurses; and those who conduct themselves satisfactorily, and prove themselves competent to discharge the duties of a children's nurse in sickness, receive a certificate, signed by the chairman of the committee, the medical officers, and the matron. Such a certificate should insure to any young woman a good situation with better wages than usual; and it is suggested that, if ladies would send their own nurses to the hospital, or individually defray the expense of training one or two young girls annually, before they sought for nursemaids' situations, the advantages would soon be evident.

We were astonished to learn, and we are sure that many of our readers will be also surprised, that the sum which has been received during the last year from pupil teachers is 5*l.* 2*s.*! We would advise ladies who feel an interest in this most important subject, to consult Mrs. Rose, the matron of the hospital: the advantages which are to be obtained only require to be known in order to be extensively appreciated.

Returning to our starting-point, we would again and again re-urge, that if we would have sound men and women, who make a sound people, we must look after the babies. The present wholesale murder without intention, which is allowed to go on, is a disgrace to our civilization.

* Office, No. 14A, Princes-street, Cavendish-square, London, W.

COOKING-APPARATUS AND KITCHEN RANGES IN "THE EXHIBITION."

It would answer no object commensurate with the space, to describe the whole of the thirty or more kitchen ranges that we have not mentioned.* It will have been clearly understood that the distinction of the English range from the foreign, is comprised in the position and arrangement of the former under a chimney-opening, instead of as a species of table, or dresser, at the side or in the centre of a room. It will further have been understood that the English ranges are divisible into those (with or without wound-up contracting cheeks) in which roasting *in front* of an open fire is the first consideration; those in which "roasting" is effected by the use of a ventilated-oven, or chiefly therein, and in which it is supposed, rightly or not, that there is great economy of fuel; and, what may constitute a third class, those which seek to secure some of the advantages of the hot-plate and all those of the open-fire, in the one range, by an alteration readily to be made in the front and top-covering of the fire. There is also the description of apparatus in which the heat of gas is used. As to what constitutes roasting, it is of course of first importance that the question should be settled. The large proportion of the grates which there are in the Exhibition, of our third class; the fact of the endeavours to ventilate ovens; and the adherence of the chief London makers, and the clubs, to the large roasting-grate, fortify us in the opinion that there may be much yet to be done, ere economy of fuel and heat can be combined with the production of the best roast-meat, whatever be the advantage of the close-range for that variety in the preparation of food which we have treated above, as equally important.

Messrs. Brown & Green, whose range was mentioned in our first article as one of the most conspicuous examples of the close-range or *kitchener*, have written to us, saying that "one of the chief improvements" they claim as "distinctive" of their ranges of all sizes compared with those of other makers, is the facility "for roasting in front of the fire *without interruption* to the action of the ovens and hot-plate; whilst the ovens are all well ventilated so as to be available for *supplementary* 'roasters,' in case of need;" and that the report to the War Office (which we referred to) certifies that "'the fire will roast three joints for fifty-six men.'" They also explain that the depth of the range is 2 feet 6 inches, affording room for the ovens, each two feet square; and that the depth of the fire-place is 14 inches immediately under the hot-plate, whilst much less towards the bottom,—"the bath-boiler at the back projecting forward in a peculiar shape into the fire, so as to economize fuel by contracting the furnace, and at the same time to secure the effectual heating of the boiler without the usual flue beneath it carrying off the heat wastefully, direct from the fire into the chimney." We give the makers also the benefit of a statement that the fire will roast in the course of three hours, three joints, with the consumption of 86 lb. of coal, besides effecting all the other operations in the six ovens, and in six boilers and six stew-pans on the hot-plate: but the grate must be examined to judge whether one large joint could be properly roasted in front of what is but a narrow fire.

The "Kitchener" of Messrs. Flavel & Son, of Leamington, which received a medal in 1851, is again exhibited with several improvements. Above the pastry-baking ovens, or more conveniently placed than on the floor, are two hot-closets. Access is provided at the back of the range, to the pipes and regulating apparatus of the boilers. Removable panels in the hot-plate; a gridiron which can be fixed at any height above the fire, improved soot-doors, a movable bottom to the grate; ventilators in the ceiling-plate, to avoid the necessity of opening the register-door, and the falling of soot; handles in front, in the mantel, to work the dampers which are in the back of the range; and well-contrived latches, are amongst the features of this "kitchener." A single joint could be roasted in front of the fire. Similar to this range is that of Mr. R. Hewens, of Leamington. It includes a winding-up bottom to the grate. One or more spaces in the hot-plate are arranged for use as charcoal stoves.

The maker of the Paragon Kitchener has printed some useful instructions for fixing and using his apparatus, but has forgotten to append to them his name. In this range, as usual, the fire, the oven or "roaster," and the boiler, require separate flues, these joining into the one large flue of the chimney. The small flue for the oven or "roaster" goes over the top, down the side, under the bottom, and out (at the nearest corner to the fire) into a vertical flue; the case supposed being that of a range with one oven. The vertical flue should be 6 inches square, or not less than 6 inches by 4 inches; and a soot-door and a damper are necessary. Should there be more than one oven, each must be treated like the one described. The flue, under the oven or "roaster," must be formed of brick-work, leaving a space of 2½ inches between the face of the brick-work and the bottom of the oven. A "mid-feather" is fixed on the bottom of each oven and boiler to throw the current into the vertical flue. "When the boiler is required at the back instead of the side, then, the foot of such boiler must form the back of the fire, the upper part of the foot being even with the top of the ovens, so that the flue can pass over it into the vertical flue at the back; and if a high pressure be required, the flue may pass underneath the boiler as well. The back-boiler, when in its place, will project about 8 inches beyond the back of the covings; and the ends of it will form the sides of the vertical flue on each side the fire." A supply-cistern, with ball-cock, to keep the boiler filled, should be regarded as a necessary addition. For "roasting" in the oven, the ventilating-valves of the oven are to be open; and, for baking, they are to be

* See page 705 *ante* and previous articles.

closed; and in using the dripping-pan, care must be taken to fill the bottom-pan with water, to prevent burning. The smoke-ducts should be cleaned out every week, by removing the plugs or other means provided, and raking and brushing; the soot in the chief-forms of kitchener, being taken out by a small door in front. Whether this necessity of cleaning constitutes a positive objection to *kitcheners*, must be left for the present, undecided; though any contrivance put forward as a certain cure for smoky chimneys, or as diminishing smoke-nuisance, should be less characterized by formation and deposition of soot than are the cooking-ranges of the kind in question, of whatever maker. Mr. T. Radclyffe is one of the Leamington people who exhibit the form of *kitchener*, with modifications, which has been described above. This manufacturer goes so far as to speak of his *roasters* as "remedying the evil of open-fire roasting," which he appears to think exists in "cold currents of air passing by the joints" causing the meat to be unevenly roasted, or the nutritious juices to be dried up or diminished. We afford him further, the advantage of an assertion that the roasting action of the heat is perfected in properly ventilated "roasters"; and that the cooked meat is greater in weight, as well of better flavour. The *roaster*, by "closing the air-pipes," but leaving the top-valve open, is convertible into a baking-oven which is regarded as better for pastry and bread than the best constructed brick-oven. Young's feeding apparatus is applied to this Leamington grate. The same description of grate, with modifications, is exhibited by Mr. W. Easthope, of Shrewsbury; Messrs. Jones & Rowe, of Worcester (who consider their 5-feet range equal to the 8-feet Leamington range, at one-third less cost); Mr. J. Sherwin, of London; and several others. The range of the same description by Mr. J. C. Stark, of Torquay, which, having the wind-up bottom, is said by that contrivance, to save nearly half the quantity of fuel consumed by other stoves,—is one of those having the white-tiled back, an arrangement which may be preferable to that of black iron "covings," as both more cleanly, and less radiative of heat into the kitchen, where the heat is not wanted. Effluvia and heated air from the hot-plate, admitted to be defects of these close ranges, have means of escape by a ventilator of louvre-plates at the back of the stove. Ranges of excellent manufacture are exhibited by Messrs. G. Wright & Co., of Sheffield and Rotherham; Messrs. J. Evans, Son, & Co., of London; Messrs. Mapplebeck & Lowe, of Birmingham; and others: but it is impossible to take note of all the variations in cooking-apparatus.

One of the best examples of our third class of ranges is the "Improved Open Fire Kitchener," exhibited by Mr. W. Owen, of Rotherham. The form with two ovens, has a hot-plate on the top of each, and a "deep *open*" fire between, for roasting. The fire is usually covered by a hood, or "concave arch-plate"; but this may be taken off, and sliding-plates, each side, may be drawn out, to separate the fire from the hot-plates and stimulate the draught. The ovens are heated on "Bradley's patent principle," by which the heat is conveyed up to the space at the top of the oven by means of a pipe at the back of the fire, having its bottom-end bell-shaped so as to receive the greatest amount of heat, and utilize all that there may be in a low fire; and by which arrangement, it is considered, a very great saving in fuel is effected. The heat, having passed to the top of the oven, is turned round a "web," or partial division; is then made to descend, and is again turned, so as to reach the vertical flue by the course required for completely heating the oven. Whilst instructions for using close-fire "kitcheners" say that, before lighting the fire, all ashes must be cleared out and dampers opened, the statement as to Bradley's ranges is that they require "neither firing-up nor ashes cleaning-out," and that the damper should never be opened "more than about 2½ inches." All such directions for setting and using, should be indelibly marked on grates. This would be equally for advantage of manufacturers and the public.

Mr. S. Deane, of London, in his "Patent Duplex-Range," similar to one fixed by him in the Instruction Kitchen, Aldershott, has two fires, together in the centre, one or both of which can be used; and one of them, having a door which runs on wheels, can be used as a close-fire. The boiler having in plan the form of the letter T, has one portion of it separating the fires. The same maker shows steel ovens and boilers, which are "lined with fire-clay," and also a revolving roasting-apparatus combined with a cylindrical screen in which three sets of joints revolve round a general centre as well as each on its axis, each joint having a separate dripping-dish. Thus, the inventor appears to say, with a fire 24 inches in width, 9 or even 12 joints can be roasted at once.

Messrs. Duley & Sons, of Northampton, we believe, claim that their boilers can be taken out and renewed with great facility; a point which should always be looked to by purchasers. Similarly should be regarded as important, the merit claimed by Mr. J. Mills, of London, in his range, that of capability of renewal, without unsetting the range, of other parts liable to wear, as the bottom bars and front-bars of the grate, which in this case can be readily taken out, and new ones dropped in. The same manufacturer claims as applied to the flues of his ovens and boilers, his "Improved Cast-Iron Flue Box," with quadrant damper which he speaks of as more easily regulated and requiring less care in setting, whilst not so likely to get loose in the brickwork as the draw-out damper, which last moreover is sometimes in the way of what may be placed on the plate or hobs.

The range by the Northampton makers we have named, and which is a "kitchener" of the best manufacture, has the principal "roasters" heated each mainly by a flue which is carried across in the position of a middle shelf. Moreover, in lieu of the ordinary ventilating arrangement of air admitted below the oven-door and an opening for escape into the flue or smoke-duct, air is admitted near the top of the door, and is made to circulate till heated, when it enters the oven, and so "consumes" the steam (according to one statement) that fish may be cooked on one shelf, and meat in the space below, without one communicating flavour to the other. If this be so, much of our difficulty as to cooking-apparatus is overcome. The ordinary arrangement of smoke-ducts, both in the case of an oven with hot-plate over it, and that of two ovens one above the other, is clearly shown in the cut in the Official Illustrated Catalogue representing the range made by Messrs. Ismay & Co., of Dover.

It should be noticed that nearly all, if not all, ranges of large size, such as we have mentioned above, require "setting" or "fixing." In other words, a brick foundation has to be built to rest the ovens upon, and other parts, which are placed in pieces, when the grate-bars are fitted in, and the whole screwed together. The brickwork, which includes the formation of the small vertical flues, demands "skilled labour" such as every bricklayer does not necessarily possess. The non-requirement of this brickwork is one of the advantages of a range which we are about to describe.

Messrs. Brown, Brothers, of Lyme Regis, and London, exhibit a form of range which, with apparatus in connexion with it, deserves particular attention. The fire-place, which is convertible by sliding plate and falling flap into an open, or a partly closed, fire, is at one end; and smoke-ducts from it pass over and under the oven or "roaster," and enter a space which is so inclosed by a door as to have externally the appearance of a hot-closet. In the portion of the plate which would form the top of this space, a boiler is fixed; one portion of this boiler is above the level of the plate, and may have a *bain-marie* for sauces on the top of it; and the other portion below, is intended to be seldom liable to have the water drawn off, the tap being placed accordingly. The smoke passes into the chimney by a duct, up the side of the jamb, which can be readily swept. No dampers are provided: it is considered that the shutting or opening of the register-door in the ceiling-plate over the fire, causing the draught from the kitchen to pass entirely through the fire, or allowing a partial current direct to the chimney, answers the same purpose, and with less liability to derangement. The omission of separate flues facilitates the object of fixing the grate entire, and without brickwork. It is only necessary, for a reason which will appear, to leave a small vacant space at the back. A hot-closet and steaming-kettle apparatus, may be placed in a convenient recess near the range, and connected with a boiler at the back of the fire, as in other arrangements. The manufacturers claim a saving of 50 to 60 per cent. in fuel. In the principal range exhibited, the grate is in two compartments; and there are three boilers in all. The back of the range being in compartments sliding, pipes can be easily got at. We can hardly go into the subject of roasting-jacks; but we must not pass by the contrivance accompanying this range, and which dispenses with all the forms of bottle, or smoke-jack, or the use of weight, or spring, or "turnspit," if any of that breed of the race canine be left. In the contrivance of Messrs. Brown, Brothers, called "Automaton Roasting-jack," a current of air passing towards the fire through a large tube in the lower portion of the roasting-screen, and produced by the heat communicated by the range to the air in the space connected with the chimney, sets in motion a small fan-wheel so as to turn the spit with velocity greater with every increase of draught and consequent roasting-heat. Some of the manufacturers of that complete arrangement which includes a large roasting-grate as a distinct feature, exhibit smoke-jacks "constructed to roast both horizontally and vertically," and having a "lever apparatus for throwing the several movements in and out of gear." Messrs. W. S. Adams & Son, of London, are those from whose description we quote. Messrs. Longden & Co., of Sheffield, propose to turn the spit, as shown in one of their drawings, by a small water-wheel. In Saunders's Patent Cooking Range shown by Messrs. Longden, the roasting screen is convertible into a baking-oven. The fire appears to be open at the side, or into the side-oven or "roaster"; and a drawing shows the joint therein on a turning-spit. In the question of roast-meat, it is necessary to consider the matter of basting. Some cooks now say if a joint be covered with a piece of greased-paper, you may dispense with the basting; and the late Mr. Soyer, we recollect, when entering upon the question, modestly as became a French cook, said something as to his first idea having taken a similar direction. If, however, the basting cannot be dispensed with, the roasting in front of the fire ought to be preferred to that in the oven. Mr. G. Zanni exhibits a self-acting basting apparatus.

The description of range with large open-grate and winding-cheek, and an oven (or two ovens, one above another) at one side, is sometimes called "Yorkshire range." One of the best of the ranges of this kind is shown by Messrs. Yates, Hayward, & Drabble, of Rotherham and London. The "Union" kitchen range exhibited by Messrs. Hayward, Brothers, of London, is of the same description, with the top of the oven serving as hot-plate. A bath is supplied by pipes from the boiler at the back. The smoke in the best arrangement of grate of this description, may be provided with escape by a narrow opening in the back-lining or coving, in place of that of the register-door; and sometimes this opening forms a portion of a contrivance of the nature of flue fixed over the back of the fire, and called, we believe, a "draught-back." We have known this arrangement of smoke-flue effect a complete cure of a very bad smoky chimney.* Such a contrivance forms part of the grate exhibited by Mr. W. M. Backhouse, of Ipswich.

The portable stewing-stove for charcoal, with hot-closet, which is exhibited by Messrs. C. & G. Talbot, of London, should be examined. A very simple and efficient-looking contrivance of a similar kind, is made by Messrs. Benham & Sons. We have already adverted to the fact that there is a question of fuel in that of manufacture and selection of cooking-apparatus. All the foreign stoves, doubtless, are more cleanly and less troublesome from accumulation of soot, than the English; because the fuel used is coke or charcoal rather than bituminous coal.

On the score of cleanliness, as well as from manageability of the heat, the method of cooking in which gas is used, is of some importance. Nothing could be more convenient in a bachelor's apartments, than one of those little clusters of jets, such as are sold by Messrs. Benham for 7s. 6d. or 10s., for boiling water, and which might on emergency cook a chop. With the larger apparatus of the same makers, or what we find exhibited by Messrs. Nock & Price, of Birmingham; E. Deane, of London; T. Phillips, of London, and Rickets & Hammond, of London; almost anything can be done, provided only that as to roasting we concede that an oven may be used, and that there be no unburnt gas in the "roaster." Some cooks maintain that escape of gas is an inevitable result from the clogging-up of orifices, which are liable to be passed over when lighting the gas, whereas such objection to jets not enclosed, as they are in a "roaster," would scarcely obtain. The main preliminary question is as to expense of the gas, as compared with other heat-giving combustible; and on that head few of the manufacturers help us. Mr. Phillips however says that, with his apparatus, a dinner for eight persons can be produced at a cost of 4d. for gas, and one for five persons at only three farthings; and that a bath can be heated in

* The unfortunate inhabitant of the house where was the kitchen-chimney in question, and whose begrimed state affected his use of English, wrote piteously of his chimney, saying he could "not live in it," and entreating his architect to "prevent it" (still the said chimney) at once.

half an hour for 2d. Mr. Soyer used gas, in place of charcoal, for broiling and stewing, generally; and was an advocate for it to that extent. It is so used, or more extensively, side by side with a coal fire, in the apparatus exhibited by several manufacturers. Messrs. Rickets & Hammond have a coal-fire in the centre of their arrangement of apparatus, above which is a gas-toasting fire; whilst a roaster and oven heated by gas are at the sides, and burners to be used in stewing and broiling at the top. The maker of the most important range in the Exhibition wherein gas is adopted *as an auxiliary*, is Mr. May, of London. This range in all its features (which are many besides the one named) is very complete. The open-grate is remarkable as having two winding-cheeks.

We cannot but think there are many improvements yet to be effected in cooking apparatus. A description of contrivance, which may be of moderate first cost, economical of fuel, and non-productive of smoke; of which the parts will not wear out rapidly, and which will be cleanly and not difficult to keep clean; which may be equally suited to the preparation of varied food, and not unsuited to roasting in the best manner, and in which the heat will be inclosed or kept about the apparatus in place of rendering uncomfortable the kitchen, are some of the points which we have adverted to as requisites in such apparatus. The English cottage-ranges, set in narrow chimney-recesses, are certainly very different to what we wish to have. A different form of "cottager's stove," and the old-fashioned wide chimney-recess, might perhaps be so arranged, and combined, as to get over much of the difficulty. We commend our subject therefore, as much to the attention of those who are planning dwellings for labourers and others, as to those who are differently interested parties.

QUANTITIES AND COMPETITION.

The method now almost universally adopted, in arranging for the execution of building works done under the superintendence of an architect, although not of very long standing, seems, like many other modern inventions, to have become almost second nature, so invariably is it resorted to. The plan of employing different tradesmen for different classes of work is now quite obsolete; and the system of working upon a schedule of prices is equally so; nor is the estimate of a single contractor considered worth having; and it is now the rule, after a competition, to enter into a contract with a general builder, who undertakes all the works of all trades for a certain agreed sum, and upon whom is thrown all the responsibility of the whole work.

This plan, the simplicity of which seems at first sight admirable, has, however, its drawbacks and its complications; and it is on some of these that we propose to make a few observations, from the employer's point of view.

The first thing to notice is the way in which the contractors who perform the work are selected. When schedules of prices were common, or even when, without their use, separate tradesmen were negotiated with, or when a well-known builder was employed without competition, the choice of the persons who executed the work was influenced a good deal by the character they held as tradesmen and workmen, the locality in which they carried on business, and so on; nor was there always a ready and simple method open either to them or their employers of comparing the cost of work executed by one man with the cost of that which a rival performed. Now, however, that the most complicated and elaborate works can be reduced to an equivalent capable of being expressed by a single short line of figures, the means exist, supposing several contractors can be led to give estimates, for an easy comparison of cost; and ordinarily it is upon a comparison of estimates alone that contractors are selected.

It is useless to inquire which of the two systems is the more satisfactory: we must accept the actual condition of matters as an established fact; and, having done so, it cannot fail to strike any observer that a large amount of unproductive labour is by it thrown upon contractors unless some method of abridging it be resorted to; and further, that a certain aspect, of not exactly hostility, but at any rate coolness, is created, or likely to be created, between contractors and their employers. The employer avowedly aims to get as low a price fixed as he can, and the contractor naturally will ask as high a one as he dare; the actual value of the work being liable to be lost sight of by both of them. The result of these two things is, first, some system by which the labour of individual contractors in preparing estimates may be diminished; and, secondly, a likelihood that, if that system be more under the control of contractors than of their employers, it will be so influenced as to swell the amount of estimates wherever practicable.

Such a system as we have just hinted at does exist, under the name of "taking out quantities." It will remain for us to inquire whether or not, in its present form, especially as practised in the metropolis, it militates against the interests of the employer, by raising the total cost of buildings, while still preserving the appearance of open and fair competition.

It will not be necessary to describe in detail the nature of the systematic and highly elaborate process upon which a building surveyor proceeds to analyze a set of working drawings, till the whole of the labour, materials, and other requirements which it appears to him are necessary or likely to be necessary for the erection of the building which they represent is reduced to a series of blank bills, only needing to be priced and calculated out, and the totals summed up, to furnish a complete estimate. This is done by a surveyor on behalf of the builders who tender for works; and, as many blank bills of quantities being prepared as are needed, each builder takes one, puts such prices to it as he thinks will enable him to do the works described, and sends in the sum total as his tender. Thus we have a machinery providing for a competition in prices, but in prices alone, the basis being uniform for all.

The basis upon which builders make up their tender is not, however, strange to say, the same upon which they make or perform their contract; and here lies one serious impediment to the successful working of this apparently beautiful system. The tender is made up from the bills of quantities; and the contract is made upon the drawings and specification, and the building is erected from them, and, as far as the employer is concerned, the bill of quantities is ignored. Supposing, therefore, that the bill was in excess of what is really requisite for carrying out the work, the result may be obtained of a genuine and even a keen competition between a number of contractors; and yet the price paid for the work would, after all, be a high one. Let us inquire how far this is a probable case, and how far it is actually known to exist.

The gentlemen employed in the business of "taking out quantities" are ordinarily a highly respectable class; but still they are men, and they are placed in a position where there is not only every inducement for them to be lavish in all their measurements and provisions, but even a necessity that in some points they should be so, while there is absolutely no motive,—hardly even that of a sense of duty,—to make them painfully exact. Legal responsibility is before their eyes on one side, but not on the other. Should a bill of quantities be deficient, the contractor, if he is obliged to perform works of which he did not get notice in the bill of quantities, has a legal remedy against the surveyor who prepared that bill, and may proceed against him for the cost of those works, and recover it; but should the employer be paying more than he ought because the bill of quantities was in excess, it has never yet been held that he has such a remedy. The surveyor, therefore, on this score, feels bound to protect himself, and take out his quantities "full," as it is termed.

Again, the builder, and not his employer, is the surveyor's client; the competing builders usually nominate the surveyor, they always pay him, and the employer is nothing to him; so that, from the feeling common to all professions of its being a man's duty to "do the best he can for his client," the surveyor feels not only inclined, but bound, to take such a course as will secure for his employers as good a price for their work as he can get them. It is true, the surveyor is sometimes nominated by the architect; and, to a certain extent, in that case, has him for a client. Still, the builder is the paymaster, and so his interests have the greater claim; and at any rate he has the power of giving or withholding other surveying work, according as he finds the bills of quantities satisfactory to him, or the reverse.

The motives referred to are calculated to weigh even with the most honourable; and there are some reasons why a surveyor's bill of quantities must always be fuller than a builder's. He is not at liberty to neglect anything, even although he feels sure it is an item which a builder in making up an estimate would not include; he is not able to put down a lump-sum for any item; he works upon a system of the most excruciatingly elaborate detail; and it is no exaggeration to say that in many cases where a builder would put down such an item as a tracery window at so many feet cube of stone, at so much per foot for materials and labour, the surveyor would take ten or twelve columns of dimensions, and fill two or three pages of bill.

Lastly, the only people whose business it is to control all this, and who alone have the power to do it—the architects,—have mostly relinquished all control and all share in the matter. Quantities, as a rule, are looked upon as a matter to be managed between the contractors and their surveyor; and it would be little to be wondered at if the result were to be, to some extent, influenced thereby.

But is it the case that such an excess as we have referred to exists? Builders say nothing can be better for all parties than the present system, and so say surveyors; but architects find the cost of executing work great, frequently unreasonably great, even in the face of keen competition: they find, when they examine a blank bill of quantities, that it is a document the length and the elaboration of which is wonderful, and the items of which are some of them startling: they hear something of "taking out full" being customary; and if they can have the good fortune to get an estimate from a contractor prepared by himself direct from plans, in competition with others prepared from quantities, they find a notable difference. In one such case within the writer's knowledge this difference was as much as over twenty-two per cent. It is probably not too much to say that half the architects now in practice have, at one time or other, felt annoyance from the results of the present over-elaborate system of preparing data for builders, and that, as time goes on, the matter will become more and more serious.

The most obvious apparent remedy is, for architects themselves to take out quantities; but this is, on many grounds, objectionable. Still it is the course pursued by men of high respectability in the country. But, besides the objection that, of our best architects, most cannot do it, and few would have the time, there would be almost certain to be the drawback that an architect commencing such a practice, and working by himself, would be liable to make his bill of quantities err as much in brevity and over-careful measurement as those now complained of do in excess.

The adoption of a bill of quantities in place of or along with plans and specifications, as a basis of contract, is a measure the evils of which would probably outweigh its possible advantages; but, as it is said to be practised in Glasgow, it would be easy to learn how it has worked there. Leaving this aside, if a plan could be arranged by which architects could themselves co-operate with the surveyors appointed by builders, the actual measurement, or "taking off" of the dimensions, probably the greatest possible safeguard for the accuracy of the work would be so procured. This suggestion seems worth consideration; and, failing this, the next best plan is the one always adopted by many of the best architects, namely, that of nominating a surveyor to act on their behalf along with the one appointed by the competitors; though it is quite impossible even for a surveyor so appointed to proceed on any other than the present over-refined methods of pursuing every item to its minutest details.

There is, however, a more radical remedy possible than any of the above, if the extraordinary elaboration of the modern system of estimating—an elaboration the true results of which are best seen in the bewildering cloud of small items, the voluminous pages, and the astonishing totals of the "bills of extras" of a London builder—could be exchanged for something more like the condensed form still in use by surveyors in parts of the north of England, and by builders whenever they have to make an estimate their own way and for their own satisfaction.

Perhaps, as the excess of evils sometimes works a cure, the discomforts not unfrequently felt under the system of continual competition may, in time, lead to its relaxation in favour of something which will admit of more open interchange of information and opinions between the builder and the architect than at present can exist. Until such a change it is almost too much to expect that employers should be able to pit a set of shrewd men against one another for the sole purpose of seeing who will do work the cheapest, without having to encounter such obstacles as they can successfully raise against the naturally disastrous effects of such constant competition.

If elaboration in bills of quantities tends to raise the general run of prices, what can be expected but that contractors should promote that elaboration as long as they can. After a time,

however, such a course must bring a reaction. The benefits of competition are very doubtful if they are obtained under a system which inordinately enhances the cost of work; and the probability seems, that either the competitive plan of obtaining tenders must be relaxed, or else those portions of it which tend to frustrate its aim must be in some way revised.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Cambridge meeting which has just now closed, though less noticeable than some which have preceded it, especially from a social point of view, has been distinguished by important statements and discussions. As these have been very widely and fully reported, we content ourselves with a few notes of subjects more immediately affecting the majority of our readers.

As President of the Economic Science and Statistics' section, Mr. Edwin Chadwick made an address which can scarcely fail to bear good fruit. We quote a passage touching

The Cost of Preventable Death and Illness.

"In towns in a low sanitary condition large masses of children are born only to die before the attainment of their maturity. Dr. Farr will support me in showing that in such towns as Manchester, Glasgow, and Liverpool, one-half the children born are in their graves before their fifth year, and much more than one-half by their twentieth year. The expense of the productive force of one adult worker is, under such conditions, that of rearing two children for each worker obtained. The domestic and political economy of these conditions is much the same as the agricultural (or hunting) economy would be, if, to obtain one working horse, two colts had to be reared. The investment on the young artisan, at the end of his apprenticeship, may, under these conditions of waste, be regarded as equivalent to that in three hunters. But for how long will that investment continue to be productive? The unproductive investment in early childhood must be distributed over the whole period of his working ability. If the duration of that ability be short, the annual instalment of capital in rearing, to be wiped off by an annual instalment of repayment, must be heavy: if the duration of the working ability be long, it will be light. To the general population of Manchester it would be about twenty-eight years: to the artisan class especially it would be twenty-five years; whilst, in less unfavourable sanitary conditions, taking one in the same county, Ulverstone for example, it would be forty years. Now, it would be of great importance to a man of the wages class (as well as to most of us) if he could be got to consider himself as an investment; and how much capital there is in him; and of the relation of his own labour to his own capital; and how it may be economised. When the truths of economic science gleam upon his mind, as it may be expected to do with the progress of public information; when he is made aware, amongst other things for the economy of that capital, that the cheapest tenements are often the dearest to inhabit; that to settle in a badly-administered city; to live in an ill-conditioned house, where he has no proper water supply or means of cleanliness; or to work in a badly-ventilated shop, will in the long run subject him and his family to double the amount of expensive sickness that he would incur in a rural or a better-conditioned district; will subject him to the loss of ten or twelve years of the duration of working ability; will, at the lowest estimate, subject him to an aggregate loss of 200*l.* of the value of his labour; will deprive him, in all probability, of the means of acquiring the last consolation of old age—easy and respectable independence, and rest upon his savings from labour; then he may be expected to resist the temptations from increased wages to settle in such place, or to insist upon conditions suitable to his labour, or the due economy of his investment; then we may expect that, under the pressure of economic elements, the attention of manufacturers will be directed to the economic conditions of work; then it will be that owners of inferior tenements, and landlords who are corporations, will be made aware of the coincidence of interest with duty; that their rents are better paid when there are fewer visitations of excessive sickness and premature mortality upon their tenants; then may be yielded to economic principles that action for which appeals have been made in vain to the moral sentiments. The annual excess of preventable deaths beyond an imperfect standard, in the county of Lancaster, is upwards of 10,000 adults per annum, who lose each more than ten years of working ability: the cost of the lost labour there cannot be estimated at less than between three and four millions per annum; of the excess in sickness, nearly 400,000*l.* per annum; of the excessive funerals, upwards of 70,000*l.* per annum; of the whole county, upwards of 4,000,000*l.* per annum. The data for this estimate were checked by Dr. Lyon Playfair, and were given in his report to the Health of Towns Commission, and have not been controverted. In my report of 1842 on the sanitary condition of the labouring population, as displaying the effect of the overcrowding or the bad ventilation of places of work, I showed that when the workpeople were discharged from them in periods of distress; fever, instead of increasing, as was once the hypothesis, diminished, and fever wards were almost emptied; the people, living upon simple food, being in search of work abroad in the less impure air of the streets. In accordance with the observations which I then made, in the present seats of the most intense manufacturing distress, the average sickness and mortality, instead of being increased, has, it has been noted with great surprise, diminished. The very town where we are assembled may be cited as an example, though in a lower degree, of the waste of capital to an extent of upwards of 20,000*l.* per annum under the same heads; to the extent, as I would inform the townspeople, of not less than 20,000*l.* per annum as compared with the rate of sickness and mortality prevalent in the district of Linton and Newmarket;—a loss due to the neglect of such sanitary measures as have been taken in the neighbouring city of Ely; in the newly and properly drained portions of which the death-rate has been reduced one-third, and that too by measures which leave much to do, but which yet give the inhabitants, as it were, a jubilee every third year, in which there are no cases of sickness and no deaths. The annual waste of capital in England and Wales from the loss of labour, from excessive sickness, and premature mortality, I estimate at between fourteen and fifteen millions per annum."

His observations on the saving effected by the education and training of children; as proved, for example, by such institutions as the Royal Military Asylum, Chelsea, and the Naval School at Greenwich, are of the greatest value, and cannot be too widely circulated.

In the Mechanical Science section, Professor Ansted read a paper on

Artificial Stones,

in which he described the various materials and contrivances used for the purpose of replacing stone where natural stone could not be obtained with advantage. He described in succession terra cottas, cements, and silicious stone. He alluded to his own observations on the subject, and also to that of the preservation of stone as connected with it. He then described the new material recently introduced by Mr. Ransome, and brought before the committee appointed last year by the Board of Works in reference to the Palace at Westminster. This material was afterwards manufactured in the presence of the section by Mr. Ransome. It consists of any kind of mineral fragments, sand, limestone, or clay, mixed into paste by a mould with fluid silicate of soda (obtained by digesting flints in a steam boiler under high pressure with alkali), and afterwards dipped into a solution of chloride of calcium. The result is an almost immediate hardening of the pasty mass; and the specimens constructed were within a few minutes handed about the room.

A discussion ensued, chiefly on the subject of the preservation of stone, in which Mr. Barry and other gentlemen took part.

Photography.

In the Chemical section (B), Mr. J. W. Osborne read a paper on the details of a photo-lithographic process invented by himself, and adopted by the Government of Victoria, for the publication of maps. The process was first adopted by the Government in September, 1859; and has since been extensively used, and many hundreds of maps and plans produced by its means. The especial object of the process was the reproduction of drawings and engravings in black and white, without the gradations known as half-tone. For this purpose a perfect negative must first be obtained by the ordinary methods. From this a photographic positive is printed by the agency of light on paper which has received a coating of a mixture of gelatine, albumen, and bichromate of potash. The action of light on this compound is to render such parts as are subjected to its action insoluble in water. The positive so obtained is covered entirely by lithographic transfer ink. This done, the paper is floated, with its inked side upwards, upon a tray of boiling water. By this process the ink is fused, the albumen is coagulated, and the gelatine not rendered insoluble by the action of light is softened. When these effects are completed, gentle friction with a sponge removes the ink and the gelatine from all parts of the paper except those which form the image to be produced. The resulting picture is a positive transfer, which is transferred to the stone in the usual manner employed by lithographic printers. The result is an image on stone from which any number of copies may be produced by the ordinary process of lithographic printing. Mr. Osborne entered into the technical details of his method, and exhibited specimens of its results possessing great beauty and accuracy.

In the course of subsequent discussion, it was elicited that one of the principal claims to novelty involved was the fact that Mr. Osborne's process was the first in which the image on the stone was effected by means of a transfer. The process of Colonel Sir Henry James, used at Southampton for the reproduction of ordnance maps, was analogous to it in this respect, but was first used six months subsequently to the process of Mr. Osborne.

Pauperism and Mortality.

Mr. Purdy, of the Poor Law Board, read a paper on the Pauperism and Mortality of Lancashire. The object of this paper was to direct attention to the connexion of distress in Lancashire, as indicated by the pauperism, with the mortality. Mr. Purdy's statistics applied to the twenty-one unions of Lancashire and Cheshire which contain the principal seats of cotton manufacture in this country. During the nine months ended with Midsummer, 1858, the deaths were 4,786 in excess of the corresponding period of 1857, or 11·9 per cent. In the same comparative terms the pauperism was increased by 20,756 recipients of relief—*i.e.*, by forty-five per cent. These twenty-one unions, including the town of Liverpool as one of the number, had an aggregate population in 1861 of 2,067,000 persons. The deaths in the March quarter of the present year had increased by 1,671, or 10·9 per cent. over the average of the corresponding quarters of the three preceding years. In the June quarter the increase was only 545, or 4·0 per cent.; the increase in the six months, 7·7 per cent. The number of paupers in the first quarter had increased by 39,847, or 65·3 per cent.: in the second quarter the increase was 50,793, or 89·7 per cent. Mr. Purdy drew attention to the remarkable circumstance of the increase of pauperism in the second quarter being accompanied with a diminished rate of increase in the mortality. For the better exemplification of the distress in the various unions as measured by the pauperism, the rise in the number of paupers relieved in the six months was computed on every 100 of the population for each of the principal unions, and the difference in the rate of mortality placed in juxtaposition with the results. Many and considerable disparities were pointed out in these tables. Stockport Union, which in the six months had increased its pauperism by 2·0 per cent. on the population, showed an increase of 17·2 per cent. in deaths. Macclesfield Union had increased 1·2 per cent. in paupers, with a decrease of 4·2 per cent. in deaths. The Wigan Union, with only an increase of 1·0 per cent. in paupers, showed an increase of 10·1 in deaths. Manchester, with an increase of 4·3 in paupers, had also an increase in deaths of 14·4 per cent.; while the Rochdale Union, with an increase of 2·5 per cent. in its paupers, had a marked decrease, amounting to 5·7 per cent., in deaths. The Preston Union, with the highest rise of all the district in pauperism, namely, 8·0 per cent., showed an increase of 6·4 per cent. in deaths. Yet the Stockport Union, with a much less increase in pauperism, had a far larger increase in deaths; the respective ratios being 6·4 and 17·2 per cent. In six unions the rate of increase in the deaths had greatly diminished: in four of the number, where the increased ratio of pauperism was excessive, the decline in the increase of mortality was—in Ashton-under-Lyne, from 26·6 per cent. to 4·0; Blackburn, 28·2 to 14·4; Preston, 19·0 to 6·4. In Rochdale there was a slight decrease in the deaths in 1858; but now the decrease is marked by 5·7 per cent., though the absolute increase in pauperism is over 100 per cent.

The Rev. W. N. Molesworth confirmed the statements of the paper with regard to the extraordinary diminution of the death-rate at Rochdale since the commencement of the cotton famine. He thought the anomalies presented by

the tabular statement might be explained by various causes; the chief of these being that the evils of excess were greater than the evils of insufficient nourishment, down to a certain point. In some places that point had not yet been reached: in others it had been passed; while there were, perhaps, some places in which a portion of the population were still suffering from the evils of excess. The case of Rochdale would serve to illustrate this. In that town the distress was not nearly so great as in many of the other towns referred to; and thus that town had not yet descended to the point at which the evils of insufficient nourishment balanced those of excess. But he, at the same time, desired strongly to impress on the section that, in Rochdale, they were very rapidly hastening to that point; and in many other parts of Lancashire they were still more rapidly descending below it. The resources of the working classes were being gradually consumed, and their stamina reduced by insufficient nourishment; and he very greatly feared that, if the manufacturing districts should be visited by any epidemic disease, the population would be swept away by thousands, and the present extraordinarily low death-rate be succeeded by an excessively high death-rate. Another circumstance that helped to explain the anomalies of Mr. Purdy's tabular statement was, that a large portion of the working classes, instead of being confined within heated and often ill-ventilated factories, spent much of their time in the open air; but the approach of winter would, of course, drive them into their own houses; and a population habituated to the high temperature maintained in the factories were more liable to be injured by the cold and damp which prevailed in those districts during the long Lancashire winter.

Mr. H. Fawcett could not make out that Mr. Purdy had at all explained how, in the case of Manchester, a very small increase of pauperism should be accompanied with so great an increase of mortality.

Mr. Purdy.—That is what I cannot explain. It is impossible to give any scientific account of it.

Colonel Sykes regretted that Mr. Purdy had not drawn any conclusion or expressed any opinion in relation to the singular and anomalous facts brought forward. Were they to infer that starvation was good for health? Literally the figures almost went that length; for where there was the greatest increase of pauperism the mortality was the lowest. He could understand that, where they had been excess, the deprivation of the means of excess might be favourable to health; but had they, within so short a period, the proper data for testing this question? Did they really know that there had been such previous excess? It certainly, however, did appear extraordinary that, with so small an increase in pauperism in Manchester, the mortality should have increased between 60 and 70 per cent. It had been stated, on the authority of the Registrar-General, that there had been a considerable diminution in the deaths of children, which he accounted for by the fact that mothers, instead of being absent from home all day in the factories, were now at home attending to their offspring.

The President did not think that Colonel Sykes put the case fairly when he talked of this as a question of starvation and ordinary distress. It was not a case of starvation when a man was deprived of beer, gin, or even of tea: it was the case of men having bread, simple food with better air, as against a high or ordinary diet with impure air. As to the case of children, there was no anomaly. Every one acquainted with the factory districts knew that the occupation of the mother meant the leaving of her child to be sustained by substitutes for the mother's milk given ignorantly; opiates in enormous quantities: now the mother was at home, and gave her child the milk nature provided and required, which made all the difference. Nothing exceeded the mischief of impure air. With simpler food and pure air the labourer was much better off.

The Lynn Irruption.

A large party of members of the Association—upwards of ninety in number—made an excursion to Lynn, to inspect the works which are being constructed at the Middle Level for repairing the mischief caused by the late disastrous irruption of waters. Mr. Appold, whose centrifugal pump has given him fame, arranged the excursion. On arriving at the spot, the party were received by Mr. Linn, the resident engineer; who, in conjunction with Mr. Appold, explained the arrangements. As our readers know, the waters are to be carried over a dam full 20 feet high, by means of syphons, which at low water discharge themselves into a canal connected with the sea by means of the river Ouse. Six of these syphons have already been laid and tried, and are found to answer so satisfactorily that the number is being increased to sixteen, which are to be completed before the end of November. They are of uniform size, 3 feet 6 inches diameter, 150 feet long, rising 20 feet in a curved line, with valves at both ends, and are laid in a row, 18 inches apart. At the experiment made with the first six syphons, it was found that they discharged 50,000 gallons a minute—an immense advantage as well in efficacy as in the saving of expense over the usual appliance of steam-pumping. For this substitution the parties interested are, it was stated, mainly indebted to the ingenuity of Mr. Appold. To set the syphons going, and to pump out the air whenever it interposes, a small steam-engine has been erected, of 10-horse power, working three air-pumps, of 15-inch diameter and 18-inch stroke.

The next meeting of the Association is fixed to be held at Newcastle-upon-Tyne, though a good fight was made for Bath.

THE HORTICULTURAL GARDENS.

MEMORIAL OF THE '51 EXHIBITION.

The architectural portion of the memorial is now being proceeded with: all the granite is on the ground; and the work is built up to some height above the continued plinth on which the surrounding figures sit. The grey granite is from the Cheesewring quarries, in Cornwall; and was dressed and polished at the quarry, ready for erection. The red granite of which the pillars and entablature are composed is from the Peterhead quarries, in Aberdeenshire.

The bronze medallions and some of the large statues, of Europe, Asia, Africa, and America, which are to be placed at the corners, are finished; not by casting, but by the electrotype process, which may be described in this wise:—A mould of the statue as modelled in clay is formed, and a plaster cast taken from it: the plaster cast is bound carefully round in every direction by a perfect network of wire; and, so protected, it is placed in a bath of the metallic salts, from which the metal is to be deposited upon it. Galvanic action is then induced in the usual way, and the metal deposited upon the plaster and wires enveloping it. When a sufficient thickness of metal has been deposited it is removed from the bath, and the plaster of Paris core is subjected for a short time to boiling sulphuric acid, which immediately melts and washes it all out; leaving a hollow mould composed of the wires sustaining the metal which had been deposited around the cast. The inside of this is coated with black-lead, and it is again exposed to the action of the solution which is to deposit the metal. The galvanic action is again put in operation, and a coating of pure copper is deposited along its inner walls. When this has reached the required thickness, which takes time according to the strength and thickness wanted, it is removed from the bath; and the outer metal mould, composed of the wires and the first thin deposit, is torn off by pincers; the black-lead having preserved an interval of non-continuity which enables this to be easily done. The perfect cast then remains. This is a long process. Could not the first mould from the statue be so prepared that metal could at once be deposited within it?

The statue of the Prince Consort, which is to surmount the memorial, is ready for electrotyping. By great labour, Mr. Joseph Durham, to whom the task was confided, has completed the model within the time originally allotted to him. When he received the commission, in February last, he was pressed to have the statue ready by the 1st of October; so that, if the memorial itself was in other respects complete, and it was wished to inaugurate it then; a plaster cast of the statue might be placed in the position the bronze cast was to occupy when finished. Very rightly, however, the idea of having the memorial completed this season was given up. Photographs of the model, showing the progress of the work, were forwarded to Her Majesty, who suggested various alterations, and communicated the ideas which occurred to her. For example, in the original design, the right arm was slightly extended, with the palm of the hand open. Her Majesty altered this: at her suggestion the arm was bent and the hand made to rest on the side,—a frequent and characteristic attitude of His Royal Highness. By Her Majesty's desire His Royal Highness is represented as dressed in the costume of the Grand Master of the Bath, something like the costume of the Spanish cavalier of the sixteenth century; trunk hose, Spanish boots, rich lace, and voluminous cloak. It will take some months to electrotype; so that the "uncovering of the memorial" will probably take place not far from the 5th of June, the anniversary of the opening of the garden by His Royal Highness the Prince Consort himself.

We fear the basement of Portland stone, on which this work of granite and bronze is being placed, will be matter for regret hereafter; but this the Memorial Committee could not control.

Experiments are being made, in the way of exposure to the weather, for testing the durability of materials for decorating the arcades; such as modern majolica ware and tesseræ.

Several garden-houses, one of cane, of very elaborate construction, have been placed in the grounds, and are worth examination. Some heating apparatus, by Weekes, may also be looked at. The International Show of fruits, vegetables, roots, cereals, and gourds, which was opened on the 8th, and will continue until the 18th, is very interesting. Such a show of fruit was never seen before.

SANITARY IMPROVEMENTS AND CONSTRUCTIONS AT THE INTERNATIONAL EXHIBITION.

JURY REPORTS.

We may supplement what has been said under this head in our own notices by some quotations from the report of the Jury on Section B of Class X., written by Dr. Angus Smith:—

"As a general result it does not appear that the actual thought stirring among men is, in sanitary contrivance, very great. The amount of education on the subject is still deficient, and all progress must be slow until the nation is brought up a little farther. There is, in fact, a desire for change—in some instances to the worse—from an ignorance of the part we have left behind. At the same time the amount of knowledge is very unequally diffused in different parts of this country, as well as in different parts of Europe. In this country we seem to have attained a much more refined idea of that which is pleasant to the lungs; and we have a higher idea of purity of air, water, and food. But in different parts of England, Scotland, and Ireland the differences are also great; the improvements being the consequences rather of imitation than of public instruction. Men learn more by example than precept, an old maxim, most wonderfully illustrated in the Exhibition, and which is the very cause of its existence.

Sanitary reforms, such as they appear at the Exhibition, show that men are striving after materials with which to act, and also after forms in which to embody the well-known old ideas. New ideas of a purely sanitary kind, we have absolutely none before us, although since 1851 the subject has grown widely. We know more of the condition of the air: we know more of the necessity of ventilation, and more of its difficulty; but the progress of our knowledge has not been seen in the Exhibition. Thus far we see a defect in it: the whole circle of human invention has not been exposed to view; and room is made for improvement in a future Exhibition. Although we have not shown all that has been done, we must not forget that much is still undone. We have not learnt the best mode of ventilation, nor solved the sewage problem. We have not decided on the best way of rendering all the food sold to the poor and to the rich perfectly free from noxious adulterations. We have not liberated ourselves from the fear of being poisoned by arsenic on the walls; nor, if this be poisonous when used on paper, have we decided if it is wise to live with other noxious metals around us ready to fall in powdery oxides as dust into our lungs. We have not solved the problem of the best pipe for supplying water, which with the purest supply shall still give us no lead or injurious metal, although one patent which has gone far towards this exists, but little used, and not exhibited. We have not learnt how to live in great communities, enjoying the advantage of social intercourse, without the disadvantages of many accumulated evils, in which we breathe with dislike. We have not solved the problem of smoke, of sulphur, and of arsenic in our towns, our manufactories, and especially our mines and metal works. We cannot warm and ventilate a small room so as to make it healthy and comfortable; and we cannot build a house suited to the wants and the wages of our population.

These are a few of the problems before us on which the nation's eyes have been more distinctly fixed; and the response in the Exhibition has not

been so great as the intellect of the country led us naturally to expect."

Ventilation.

"There are several attempts to solve the great question of ventilation. Amongst these, several applications of wire-gauze and perforated zinc for ventilating rooms are included in our section. The general principle of all of these is the admission of fresh air diffused through a small opening, either by simply drawing down the windows, or by opening a slide valve. There is nothing in any of them calling for special remark; but generally they are all applications of a long-established principle made in the right direction. Cooke's apparatus claims to do more than this, but it was not demonstrated to the Jury. It is neat and never intrusive, and must, like all gauze blinds, remove an immense amount of dust. Two other forms of ventilating apparatus are exhibited in the same place, which have higher claims to commend them. One is the glass-louvred ventilator of Mr. Moore (United Kingdom—2393), the very extensive introduction of which is sufficient proof of its simplicity and usefulness. The other is a concentric tube, exhibited by Mr. M'Kinnell (United Kingdom—2392), with its application to the ventilation of ships and dwellings. There are other applications of the same principle not in the Exhibition, but Mr. M'Kinnell's contrivance is an ingenious adaptation, and merits recompense. We preferred to select the glass louvre of Mr. Moore and this ventilator of Mr. M'Kinnell for Honourable Mention; the former on account of its simplicity and general utility; the latter on account of its applicability under certain conditions to closed apartments and holds of ships.

Mr. Moore's ventilator is of glass, and in the form of a Venetian blind. It opens or shuts by changing the angle of the laths of which it is composed, as a Venetian blind does, but it is not made to be raised or lowered.

There are several applications of the principle of warming part of the fresh air admitted into dwelling-houses by means of the waste heat behind the fireplace. They are all improvements more or less ingenious, and in the right direction; but the subject is comparatively new, and none of these applications are of such importance as to merit special recompense.

Mr. Watson, of Leeds, had long ago introduced his double tube, or tube with a diaphragm, which, under many circumstance, acts remarkably well; but instead of one branch having a current up and another down, it frequently happens that the air is found moving in both tubes in the same direction. Mr. Muir, of Glasgow, removed the difficulty to a great distance by having the square tube crossed twice diagonally, and so causing with almost every wind an inclination to produce a difference in the four currents. There are numerous situations in which it must supply abundant pure air at all times. These four tubes are stationary substitutes for the two cowls, one towards the wind, the other from it, and which must be moved according to the direction of the wind. There is, however, a natural difficulty inherent in the subject itself—that of causing two currents of air to run together so very closely. Mr. M'Kinnell puts one tube within the other, and this plan is said on high authority to be extremely beneficial in the holds of ships. But when currents of air come so near each other, they must cause numberless eddies, and the impure air can only pass after being very much mixed with purer air, and thereby a much greater amount of heat is lost than is at all needful. Many praiseworthy attempts are made to purify the atmosphere of a room by merely bringing the air through perforated wire-gauze, zinc, or glass.

There are several inventions for causing the air to turn corners before entering a room,—that is, to cause it to enter in a zigzag manner. There may be some value in this, as the great violence of the wind is prevented, and rain is also kept out at the same time; but they promise little. No invention in ventilating will ever dispense with an abundant supply of pure air. Many have a good method, but are afraid to use the large quantity of air required.

Messrs. Doulton & Co. separate the flue of the ordinary fireplace into two parts with a zinc partition: the one is for the smoke: the other is connected with the upper part of the room by an opening, where Arnott's valve is usually put. This removes the warm and fouled air; the draught being caused by the heat of the parallel flue, as well as the heated air of the room. An Arnott's valve may be added. This of the Messrs. Doulton cannot be adapted to ordinary fireplaces, but it seems to be extremely promising for new houses.

The Military Commission of Vienna, appointed by the Government to inquire into the question of ventilation, has decided on using mechanical means; and a fan drives the air forward into the garrison hospital. A medal was awarded to the Imperial Royal Commission."

The subject of ventilation and of warming was only partly brought before Section B, and only a partial account is given.

"Mr. Zimara, of St. Petersburg (Russia—316), exhibits a stove which conducts the heated air and products of combustion through a numerous collection of earthenware tubes under the dwellings, and allies itself more with the old Roman method. It is a plan which in cold climates may be of the greatest advantage, although too heavy, cumbersome, and expensive, for small houses even there. By it the whole under-part of a house is in fact converted into a Dutch stove, which long retains its warmth. A medal was given to Mr. Zimara.

Mr. W. Pierce (United Kingdom—2395) is mentioned honourably for his mode of Huthuance's drying chamber for clothes.

None of the models at the Exhibition use the heat of the fire so as to warm the space between the walls, and to render it a drying-room for clothes. The model washing-houses are very valuable for the poor, but a commodious way of using the heat produced in their own fires at home is very much wanted. At present a great deal of the heat is expended in drying bricks and mortar that never ought to have been wet. This would be much better employed in warming the room itself, or even an intramural cavity, which would also give out some heat to the rooms. This, however, occupies space which is not generally to be spared.

The great demand in this country is for warmth and dryness: give these, and we are ready to ventilate sufficiently: deny these, and the whole population instinctively prefers bad air to cold-giving air: therefore, if we ventilate sufficiently, we must warm."

As to Dry "Closets."

"Mr. Spence had some time ago cured his own house in Pendleton, Manchester, of a sewer disease, by connecting the sewer with the house chimney; and he proposed to carry all the air of the sewers into chimneys, or into one great chimney which would supply the whole city, the effluvia to be disinfected by the smoke: this plan included the separation of surface-drainage. But the separation of surface-drainage would probably render the operation of purifying towns a profitable one, even with our present knowledge of the value of sewer water. Mr. Spence went so far as to propose one chimney for the whole of Manchester—a bold and, many will add, a fine idea. The ventilation of sewers and of water-closets by leading the effluvia into the air without disinfection is a most inefficient method of purifying air. It certainly removes the evil from our own houses, but it sends it to our neighbours, although in a more diluted state. If this were done by a whole community, we should have our towns no whit better than now; perhaps worse; because there are increased inducements given to evaporation. If the sewers are ventilated, however, Dr. Stenhouse's mode, through charcoal, is decidedly the best.

Several have acted on the idea of disinfection, and produced dry closets which shall give no effluvia. G. Smith & Co., of Glasgow (United Kingdom—2401), have exhibited one which pours out sawdust from a perforated box every time the lid is closed. Mr. Owen, of Manchester, had some time before done the same with McDougall's disinfecting powder. The same substance is used by Messrs. Muir & Carrick in their dry water-closet; and Dr. Lloyd, of Anglesey, seems to prefer charcoal in that which he has been recommending: he seems to have been the first of the class, and made many models not brought to the Exhibition. There seems, in fact, to be a movement towards dry closets, and an inclination to object to water-closets. This has arisen from the condition of the Thames chiefly; not unconnected also with the Clyde, as well as some small streams scattered up and down England. This feeling has produced several ingenious schemes, one from Dr. Joule, who for a while left his other important investigations, and contrived underground receptacles for sewage, which receptacles should be emptied by air-tight carts. Of these underground receptacles, one to every group of houses was considered not to be a return to the old cesspool method, which allowed one or more to each house; and they were to be in the towns, because the sewage, not being mixed with the water of towns, would not flow far, from its want of fluidity. The experience of Paris seems conclusive against this system, although, as Dr. Joule projected it, it is far superior to that which the Parisians are anxious to get rid of, although it is similar in kind. Mr. O. F. Glassford has long advised receptacles of a similar kind, but at greater distances: he draws the sewage from them into larger receptacles by pumping."

"In Berlin and in Paris, the system has been carried on more carefully than anywhere, and so-called closed vessels are used for the purpose. But it is scarcely possible to keep such vessels well closed. Disinfection by chloride of zinc is adopted for the cesspools, but whoever has watched the process must be satisfied of its failure. Nowhere does the emptying of ash-pits among us cause such a nuisance as the emptying of a disinfected cesspool in Paris, with several officials to watch its progress.

It is rather strange to see how easily men's minds are diverted on some points. We forget the great deliverance obtained by water-closets, and some are actually willing to go back again to a state of pain and misery for the sake of our rivers, instead of continuing the process begun and bringing it to perfection. It needs but little ingenuity to reject all inventions made by those who have laboured for the benefit of mankind, and to return to a primitive state of filth and discomfort, as many contrivances now seem bent on driving us. We may consider it as certain that no plan will ever be devised for removing refuse from our houses equal to an underground flow, self-acting and out of sight. To wish more seems impossible: to perform this is known to be possible: to remove a few difficulties connected with its use in some places is all that we require to render the system perfect. The wants of society are becoming more numerous: there is no room above-ground for the mechanism by which these wants shall receive attention: the earth can cover up or destroy all that annoys us. It must, however, be confessed that there is a necessity for the dry system in many places where cold or dryness prevents a flow."

Water Supply.

"Fortin-Hermann, Brothers (France — 1189), have introduced several alterations into the system of water supply: amongst these is a mode of joining pipes. The two pipes are attached by an iron collar, rather loosely, so as to allow a collar of lead which is fixed on each to slip under the iron collar: the lead is then hammered inwards. By this means a certain flexibility is obtained in the joints, which is an extremely important consideration. The two pipes may be lifted up as one. When it is required to undo them the flexibility may be extended to rupture by one or two men leaping on the point of junction, the distant extremities of the pipes being supported. The water-taps are made so that they shut themselves by their simple weight: they are opened by merely lifting up the point, as there is no pressure of water. This pressure is removed by each being supplied with a small cistern, kept full by a ball and tap. The entrance to the water-tap on the causeways is made by one pipe sliding over another, so that when waggons pass over it the opening sinks with the pavement. A medal was awarded to Messrs. Fortin-Hermann. The *bouche sous trottoir* adopted by the city of Paris, placed flush with the level of the ground or pavement, replaces the standpipe. It is a hydrant, which is also used for gutter-washing and road-watering. The *bouche d'arrosage*, used for watering public roads, is also a step distinctly in advance of our usages in England, where water ought to be abundantly supplied for all purposes."

Bricks and Earthenware.

"Bricks generally do not come under Section B of Class X., but a perforated and highly-glazed specimen, made by Mr. Jennings (United Kingdom 2386), called for special attention. It is used at the Herbert Hospital for the purpose of preventing the rise of moisture into the other bricks of the building. It forms the first layer above the surface of the ground: by this means the surface can never convey its moisture to the bricks above this layer. It is perforated; and, by this means, allows free access of air to the space under the floor of the building. This brick is exceedingly strong; and it is believed by the inventor to increase in strength because of the perforations. We do know that a great amount of moisture may be be raised from the moist earth by absorption,—an amount which may, and which does, entirely destroy the health and comfort of dwelling-houses, and, we may add, the houses themselves. The same effect is abundantly observable in houses built

with very porous bricks or other porous materials. During wet weather a great amount of water is absorbed; and when warm weather comes it is evaporated, removing from the building a great deal of heat instead of contributing to comfort. In this land of frequent showers there is seldom an interval sufficiently long entirely to dry the bricks; and fires are used to prevent dampness, which might easily be prevented by using good building materials. We much need a brick for the whole building which shall resemble this made by Mr. Jennings in the compactness of its structure and the smoothness of its glaze. Another result would follow: the blackness of the rain falling in our smoky towns would not leave its traces: these black spots would be removed by showers rather than left by them, as we find to be the case where a smooth surface is exposed to the action of wind and rain together.

Mr. Jennings obtained a medal for his general improvement in arrangements for sanitary purposes. There are some specimens in the retiring rooms of the Exhibition. There was a completeness in the arrangements and fittings which very much pleased the Jury."

Earthenware Pipes and Vessels.

"Messrs. Doulton & Co., of Lambeth (United Kingdom—2268), showed some very beautiful specimens of earthenware. Sewers were exhibited 3 feet by 2, and made in segments. The sewer is made with hollow walls, or two thin walls with a space between them. Each piece formed about the fourth part of the whole circumference, and is fitted on the others. When packed for carriage the hollow walls save a great deal of weight; and the segments being fitted on each other save a great amount of space, as one curve nearly corresponds to the other. This must effect a considerable saving in expense of carriage. The various parts are cemented; so that here there is some additional outlay in this respect; but for foreign shipments the packing and carriage must far outweigh the expense of cementing.

The principle has been applied to the formation of tubs and cisterns of earthenware. In this case the segments are dovetailed and cemented: very large vessels of earthenware may, in this manner, be made at a moderate expense. At the same time it is not at all improbable that by doing this we are cutting instead of unravelling a knot. It seems as if the manufacture of large earthenware vessels were rendered difficult rather by our ignorance, which it would be well to remove, than by natural obstructions; although a substitute for knowledge not yet attained must of necessity have some of the characteristics of the real knowledge itself, as in this fine specimen of Messrs. Doulton's pottery.

A medal was given to Messrs. Doulton; also to to Miller and Hochstetter (Austria—1390), for earthenware pipes; and to A. Richter (Austria—1393)."

Paints.

"There is a considerable amount of attention paid to hydrocarbon paints by Dupont, of Cherbourg (France—1270), and by Ruolz and others. These paints are chiefly pitch or wax, or both. The difficulty, of course, is to remove the dark colour of the pitch. This is done in some cases with a good deal of success when the colours themselves are dark; and among these, especially, oxide of iron may be mentioned. M. Dupont uses it for wood and iron.

L. Machabée (France—1380) uses fat, wax, and pitch to cover pipes, as has been done in this country.

These were shown by the Paris Commissioner; but the section did not seriously consider them, both because they were brought in hastily at the end and because they seemed not intimately connected with the subject of inquiry.

Water Pipes.

Water pipes of paper and asphalte have been made by several parties. A curious objection was found to occur in Switzerland: the paper was eaten by insects. Guicestre & Co. (France—1255) make them also of sand and pitch. M. Sebille, of Nantes, uses finely-ground slate, and makes a very fine tube. He shows the value to be in the simple mode of making a joining. The parts to be united are melted by a hot iron, and put together. When a curve is to be made the pipes are merely warmed before a fire, and bent as desired. The pipes are prepared in moulds, into which the substance is put when soft, and being pressed tightly, is left to cool. Pipes 3 inches in diameter inside can be made for 2¼d. per mètre, or, let us say, per yard. With a capital of 500*l.*, 10,000 mètres can be made in a day, according to M. Sebille. When the pipe is very large, the ends have a piece of sheet-iron inserted into them. About one-fourth of the pipe is tar, and three-fourths of slate. The pressure which they stand is said to be 10 to 12 atmospheres. M. Sebille also shows tubes made of pitch and coarse sand and cinders, useful in conveying acids. In addition, there are tubes of lead coated with tin; the coating made when the tube is being drawn. This plan seems to have gained a good deal of consideration in France. In Manchester it was tried about fourteen years ago with great care. The coating was made when the lead was soft: melted tin was placed at the top of the core, which determined the size of the bore, and the lead took up the tin when it was soft. Pipes were laid down in Salford, and specimens were examined after one, two, and three years. There was a manifest progress towards separation of the two metals even during the first year; and in the third year the spots were both numerous and large; the lead surface giving way more rapidly when the tin was removed. The manufacture was discontinued.

A medal was awarded to M. Sebille for his ingenious employment of bitumen, slate, and refuse materials."

THE INTENDED BRIDGES AT BLACKFRIARS.

After much discussion, as our readers already know, the design submitted by Mr. Joseph Cubitt for the new Blackfriars Bridge was selected, and will be carried out. The same engineer is to build the bridge for the London, Chatham, and Dover Railway, which is to span the Thames closely adjoining the new road bridge. On one page we give a representation of each of the bridges, separated for the sake of clearness.

Blackfriars Bridge will be built upon the site of the existing structure; but, being of much greater width, will be so placed that its centre line will coincide with that of the present bridge. It will consist of five arches, varying in span from 164 feet to 189 feet; the span of each of the two arches nearest the shore being 164 feet; of the arches next to them, 176 feet; and of the centre arch 189 feet. The height of the soffit of the bridge at the centre of the largest arch will be 27 feet above the level of Trinity high water, and at the centre of the arches nearest the shore 17 feet above the same level. The height of the springing or imposts of the arches above Trinity high water will vary from 5 feet at the abutments to 10 feet at the piers of the centre arch.

It will probably give a clearer notion of the accommodation to the navigation which these dimensions will afford when it is explained that it will be considerably greater than that afforded by the arches of London Bridge.

It is proposed to construct the foundations by sinking wrought-iron caissons of the same size as the piers, through the sand and gravel which form the bed of the river, and some depth into the London clay beneath. The gravel and clay in these caissons will then be excavated, and the caissons filled in solid with masonry.

The four wings of the abutments are so designed as to form bold pedestals, on each of which an equestrian statue may appropriately be placed. Above high-water mark there will be erected, at each end of each of the piers, a massive column of red polished granite, with foliated capital and base moulding. Each arch will consist of ribs of wrought iron, strongly connected together by cross bracing; the spandrils of these ribs being filled in with ornamental bracing. The arches for the entire length of the bridge will be surmounted by an ornamental cornice and parapet. The floor of the bridge will consist of plates of wrought iron resting upon the ribs above mentioned: this will be covered with a layer of concrete, upon which the granite paving will be laid.

The levels of the approaches in Chatham-place and Albion-place will not be altered; but, in consequence of the crown of the proposed bridge being much lower than that of the present one, the gradient of the road on the former will be much better than that of the latter, viz., 1 in 40, instead of 1 in 22.

The width of the new bridge will be 75 feet, giving a carriage-way of 45 feet, and two footways of 15 feet each: the total width between the parapets of the present bridge is only 42 feet.

The design for the bridge for carrying the London, Chatham, and Dover Railway across the river Thames, which has now received the assent of the Admiralty, the Conservators of the Thames, and the Corporation of the City, consists, like the road bridge, of five openings, the two nearest the shore being each 159 feet in span; the two next to them 173 feet; and the centre arch 183 feet. The soffit of the bridge will be level, and will be placed at a height of 30 feet above Trinity high water. The abutments will be built of masonry backed with brickwork, the foundations being put in by means of a coffer-dam constructed in the ordinary way. Wrought-iron caissons will be employed in the formation of the foundations of the piers. They will be sunk to a depth of about 40 feet below high-water level; and, the clay having been excavated from them, they will be filled in solid with brickwork in Portland cement up to within 6 feet of the low-water line. The portions of the wrought-iron caissons above that line will then be removed, and the pier built up solid with brickwork, faced with Bramley Fall up to about 4 feet above Trinity high-water level. Upon each pier will be placed three clusters of four cast-iron columns each; one cluster being placed immediately under each of the main girders.

The superstructure will consist of three wrought-iron lattice girders, 16 feet deep, and cross girders resting on their lower flanges. The distance between the main girders will be 25 feet.

The cost of the road bridge is estimated at 265,000*l.* Of the railway bridge, no estimate has been prepared. Messrs. Peto & Betts will execute the latter; but the contract for the road bridge is not yet let.

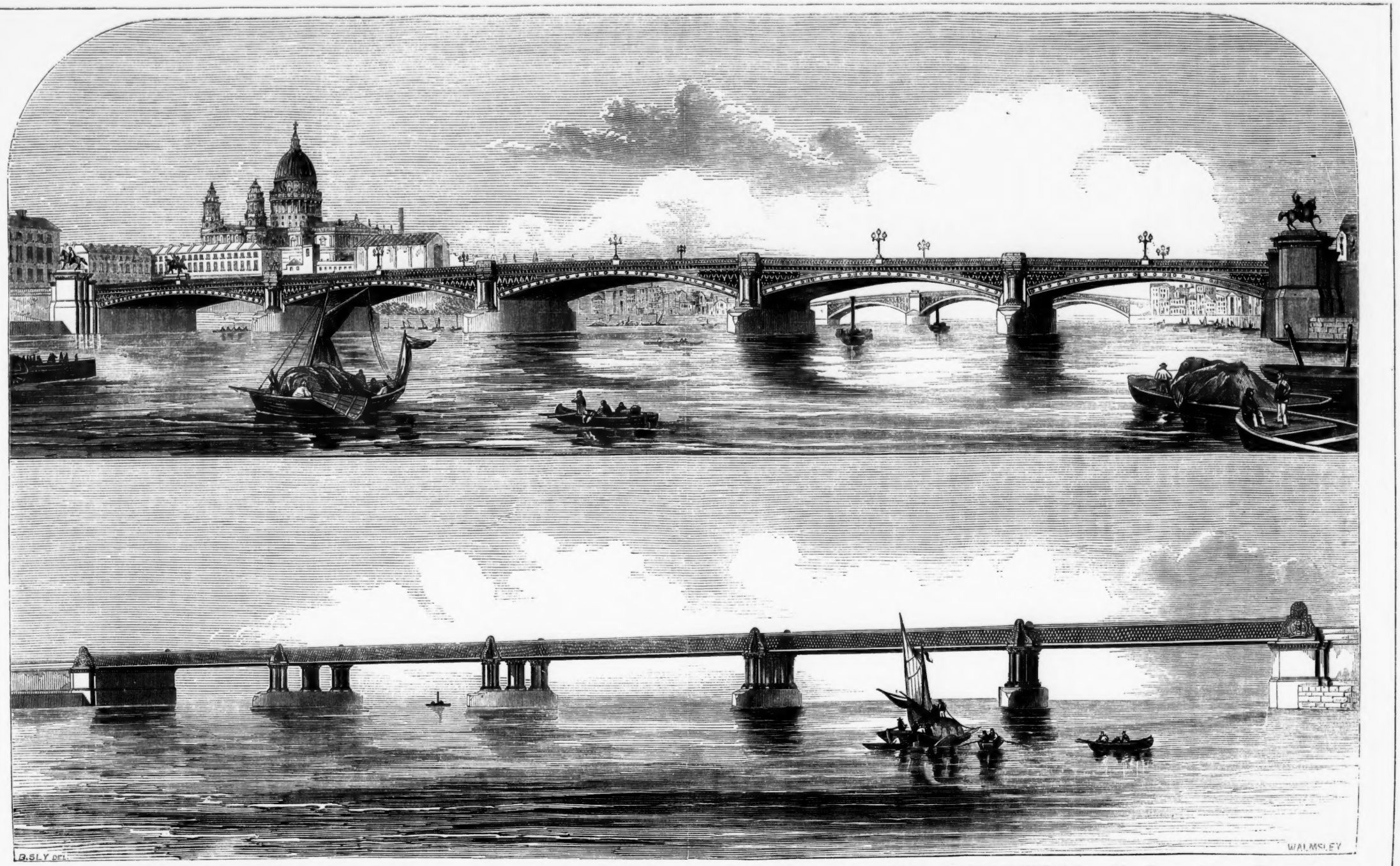
COMPETITIONS.

Dublin: City Hall.—A report of a committee on plans for the improvement of the City Hall recommended the design signed "Cui Bono" for a premium. Alderman Campbell said it was desirable not to proceed with the intended improvements at present. It was not unlikely that before long the Exchange-court Police-office would be transferred to another locality, whereby the Corporation might be enabled to procure some addition to the City Hall premises. It was suggested that the premium recommended ought to be paid. After some conversation, it was resolved that the subject be referred for consideration to a committee of the whole house.

Derby: Masonic Hall.—Information is asked for by competitors as to the decision in this case.

ELECTRO-TELEGRAPHIC PROGRESS.

A new discovery has been made, says the *Court Journal*. A telegraph without wires can pass through earth and sea, and every one may establish his own. It is at present a very great secret in scientific circles, adds our authority. It is evident that wonders will never cease. The idea of an electric telegraph without wires, however, though not yet fully realized, so far as we know, is not so new as our authority appears to imagine. A Dundee gentleman, lately deceased, actually laid (if we may so speak) an electric telegraph across Portsmouth harbour, without wires, and worked it too, by permission of the Government. He also telegraphed across the Tay in the same way. Although no wires crossed the river or the harbour, however, a wire with earth plates at right angles was requisite at either side. The *Court Journal's* secret would seem to realize the old original idea of the magical telegraph, which consisted simply of two alphabets set in circles with a pointer to each, but without any connecting wires, and by means of which it was said that two correspondents could mutually communicate their ideas, however far they might be separated throughout the world, so long as each possessed his alphabetic circle and its magical or magnetical needle. It was thought, naturally, that this traditional idea indicated merely the wire telegraph itself; but now it would appear that the wire is but a clumsy and unnecessary appendage, which has only been preparing the way for the reintroduction of the old original telegraph of antiquity!——The Pacific Telegraph Company have erected their wires between the Missouri and the Sierra Nevada, a distance of 1,600 miles, and thus completed the telegraphic communication between the Atlantic and Pacific in four months and seventeen days. The company have entered into an arrangement with the Emperor of Russia by which, conjointly, they will construct a continuous line through British and Russian America; across Behring Straits, and through Asiatic and European Russia, so as to connect Petersburg and Washington. This line will be 14,000 miles in length. Russia has already completed 3,500 miles, and collected materials for extending the wires from Siberia to the mouth of the Amoor, the Mississippi of Atlantic Russia.



INTENDED NEW BLACKFRIARS BRIDGE, LONDON.——THE LONDON, CHATHAM, AND DOVER RAILWAY BRIDGE, AT BLACKFRIARS.——Mr. Joseph Cubitt, Engineer.

ON STAINED GLASS.

JURY REPORTS OF THE EXHIBITION.

In connexion with the Jury's Report on stained glass and glass used for decoration, Mr. Apsley Pellatt has written this general view of the subject:—

The adoption of painted windows was concurrent with the improvement in architecture, and especially in the introduction of the Early English and Gothic, which succeeded the Saxon and the Norman. From the twelfth to the thirteenth century the large expenditure, in England and on the Continent, on cathedrals, churches, and religious houses induced a demand for decorated glass windows; and the early Archaic style was then generally introduced into windows, which were not only beautiful in themselves, but conferred a beauty upon the interior architectural decorations of these ecclesiastical buildings. At this period, and for centuries subsequently, the Archaic style was adopted: it consisted of a perfect mosaic of rosettes, flowers, leaves, and other designs. The borders consisted of small pieces of variously-coloured glass, secured by lead to the iron framework of the windows, in conformity with the outline of the design. In the centre, secured in a similar manner, were the medallions of a single figure or group of figures. The borders were usually harmonious and pleasing: the drawing of the figures was often grotesque, and in some cases almost amounting to caricature. The leading of the glass, being arranged to follow the outlines of the pattern, appears hard when viewed in close proximity; but, like the severe outlines of Raffaellesque subjects on china, when viewed at a proper distance this harshness nearly or wholly disappears. Many patrons still adhere to this severe Archaic style; while others, in keeping with the taste of the present time, admit a modification of more correct outlines of the figures. A good specimen of the coloured mosaic treatment, with its borders of a flowery kind, the lesser spandrils being fitted with a flowing ornament of various colours upon a red ground, is to be found in the circular window of the north transept of Lincoln Cathedral, as recently restored by Messrs. Ward & Hughes. The lower lights are in contrast with those above, on the grey or grisaille mosaic treatment, the chief parts of the white glass being shaded or worked with brown or black lines of enamel colours, intersected with small portions of coloured mosaics, the grey chiefly predominating. The manufacture of coloured glass in small effigies, opaque mosaics, and vessels, dates as far back as the Egyptians, Phœnicians, Romans, &c. Its introduction for windows in the style termed Archaic was during the twelfth century. The art was considered not merely as decorative, but as a pictorial representation of Scripture history, aiding Christian teaching. The repose and solemn subdued effect of light passing through the varied coloured glass contributed to the character of the subject sought to be impressed upon the mind. The first or Archaic style commenced at the latter end of the twelfth and the beginning of the thirteenth century. Examples are to be found at St. Denis and Bruges, and in Canterbury, Lincoln, and Salisbury Cathedrals. The second or Decorated style was introduced about the end of the thirteenth century. Good examples may be seen at Strasburg and Gloucester (recently releaded by Messrs. Ward & Hughes). The third or Perpendicular style, from 1380 to 1430. Another style, the Cinque-Cento, dates from 1500 to 1550, examples of which are chiefly to be found on the Continent, viz.,—at Brussels, Liège, &c.; the examples of the Perpendicular being at Cologne, Winchester, York, and at St. Margaret's, Westminster. In the Early English, such as the north transept of Lincoln Cathedral, the figures are less grotesque than in most other examples of that date. The figures were generally placed in medallions, canopies having not then been introduced. The next period, the Decorative, is marked by an extensive use of canopies: the drapery was more flowing and graceful, especially in the coloured mosaic and grisaille borders. About this period the yellow stain was introduced, which pleasing colour softened the white used in the earlier styles, and had a good effect when stained in portions, the cased red or blue being taken out to receive the yellow. The third, or Perpendicular, style is marked by its being more soft and silvery, and also more delicate and refined than the preceding; having no rounded or projecting cornices. The Cinque-Cento style is of Italian origin, and more picturesque, being evidently influenced by the progression of oil painting. All these styles obeyed the spirit of their times; glass-painting agreeing with the state of the arts of each period, and in harmony with the architecture and the taste of its various epochs. The principal difference between ancient and modern glass windows arises from the latter being brighter and of a higher key than the ancient, while it has less tone and richness, which, like the paintings of Titian and the old masters, may be viewed for any length of time without fatigue to the eye. Continental glass being thinner and of a higher key than the English, a fictitious surface and tone are obtained by enamel painting, which takes off the lurid glare, but deadens and too much lowers the tone: this ineffective imitation is easily detected. Modern windows of inferior materials, being charged with bright colour at a higher key, transmit too readily through the glass bright rays of different colours antagonistic to each other, which fatigue the eye and form an unpleasant contrast to ancient glass, or to that which has been recently made on the same principle, and which for want of a better term we shall call antique. Although homogeneous flint glass is so essential for chandeliers and household use, and especially for optical purposes, the reverse is required for coloured window glass, technically called pot metal, to imitate that of the thirteenth century. Every colour of the spectrum, viz., violet, indigo blue, green, yellow, and red, are produced in glass by the use of the oxides of the following metals, viz., gold, silver, chromium, tin, copper, iron, manganese, cobalt, antimony, nickel, and uranium: carbon also produces yellow for pictorial purposes. Window glass, although almost indestructible by time, whether coloured or of a greenish white, when long exposed to the action of the atmosphere, is liable to partial surface decomposition; and, if not too much decomposed, prevents advantageously the too free passage of the rays of light through it: old glass thus affected softens and blends the pictorial effect; and the colours remain sufficiently vivid and brilliant without fatiguing the eye. Modern amateurs and glass-painters have had their attention drawn to the fact, that the agreeable blending and harmonizing effect of ancient glass, although occasionally due to surface decomposition, owes its chief charm to the retention of the striæ and small bubbles in the body of the glass. The constituents of such glass have been perfectly vitrified, and the colours fully developed; but, being less transparent than when thoroughly fined (like the ordinary clear-coloured glass), it becomes less dazzling and more subdued. To succeed in making striated and bubbly-coloured glass, having a horny or gelatinous appearance similar to the ancient, the fining process must be arrested during the latter part of the fusion, by reducing the heat of the metal to a sufficient consistency for working before the bubbles and striæ are fully driven off: great attention is necessary on the part of the manufacturer to reduce the temperature of the furnace just at the right time to prevent the metal becoming too clear. This imitation of the ancients constitutes the chief improvement, since 1851, as regards the vitrified material. Although these gelatinous striæ and bubbles are quite apparent on close inspection, they disappear when seen from a proper distance; a portion of the light becoming absorbed, but retaining the full richness of the colours. Pot-metal blues, greens, and rubies, &c., by this system of embodying in the mass the hindrances to the too free passage of the light, are far superior in effect to those of the ordinary, cheap, modern, clear, bright-coloured glass. No person of taste should require the latter, which will fail to produce what is termed the peculiar "dim religious light" of the ancients resembling the reposing colours of the spectrum. Blue is often used as a background to groups or single figures, as well as to the drapery and borders, and may therefore be considered the prevailing colour; and after this are ruby and green, all pot-metal colours. About the year 1850, Messrs. Powell & Son commenced manufacturing antique glass of white and various pot-metal colours, a considerable portion of which, especially the blue and ruby, was equal to the best specimens of ancient glass of the thirteenth century. This was selected by Messrs. Ward & Hughes for the four windows painted by them, and erected in the Temple Church, London, about the years 1853 and 1854. Messrs. Hartley, of Sunderland, and Messrs. Lloyd & Summerfield, of Birmingham, have also produced antique glass. This glass is striated, bubbly, and gelatinous, and sometimes the ruby is streaky. Pieces of dark and light ruby are occasionally leaded separately, and placed side by side, to give the effect of shading without the use of enamel colour. A national debt of gratitude is due to Charles Winston, esq., author of a work on "Ancient Glass Printing," in two volumes, for his long, persevering, and successful efforts to revive the rich colours and low tone of ancient glass, the best specimens of which are to be seen in the four windows of the Temple Church, painted at his suggestion and under his superintendence. If the colours in these windows equal the best of the ancient, of which there is little doubt, it is owing to the various specimens he caused to be analyzed, and the synthetic experiments he made, which enabled him to reproduce the glass, and furnish recipes gratuitously to the glass-maker. Foreign manufacturers have, no doubt, availed themselves, ere this, of Mr. Winston's liberality; and as wood fuel and open pots succeed best for glass dependent upon carbon as a colouring constituent, no doubt they will ere long rival our productions of antique glass for windows. Messrs. Clayton & Bell, in their artistic treatment of the severe Early Archaic style; Messrs. Ward & Hughes, in their window for St. Anne's Church, Westminster, of the style of the thirteenth century, the figures of which are treated in keeping with modern taste, similar to those in the Temple Church; Messrs. Powell & Son, in a window wholly of antique glass, of their own manufacture; likewise Messrs. Lavers & Barraud, Heaton, Preedy, and other artists, have availed themselves of English antique glass, much of which rivals the ancient in rich colour and low tone, and has a crispness and shellac appearance so well calculated to absorb the rays and retain the richness and beauty of the ancient colours. While, therefore, most of our Continental neighbours exhibit windows of inferior material, fully equal or superior in artistic merit to their painted windows of 1851, the English, availing themselves of the superiority of the antique glass, excel their exhibits of 1851. The Exhibition of 1862 may be considered so far as a triumph over that of 1851: the artistic progress has, however, been less than might have been anticipated. The various attempts which have been made to imitate the richness and depth of the ancient material, by coating the glass with enamel paint, have produced no other effect than that of depriving it of its brilliancy, and, consequently, the glass paintings in which this expedient has been resorted to, of one of their chief distinguishing merits. In all the glass paintings of earlier date than the last quarter of the fourteenth century, until which period the glass was not over clear, substantial in appearance, or intense in colour, the artists seem to have relied for effect principally on the richness and depth of the colouring. In these works the means of representation may be said to have been reduced almost to the lowest degree. We are strongly impressed that the difference of effect between such ancient and modern glass does not depend on the state of the surface, but on the composition of the material; and this result has been strengthened by the result of some experiments recently made, by which the very great difference in the composition of modern glass of the thirteenth century is clearly demonstrated. The cheaper sorts of white and coloured glass, as alluded to in the foregoing extract from the Report of the Commissioners of 1851, counterfeit the ancient glass by coats of enamel colour, which only produces a misty and cloudy effect, merely blinding or shutting out a portion of light; but it cannot give the depth and richness of ancient colours. If varnish colour be used for such a purpose it will only serve a temporary object; and, even if the enamel colours be burnt in, they are not always to be depended on, being liable to crack off by long exposure to the action of the atmosphere. Bertini and others obscure a portion of the back by roughing, or by a layer of white or neutral colour, so that little or no light may pass through the main figure of the subject, which rather resembles fresco than transparency. The latter is generally considered to be one of the essential conditions of glass painting. Brown enamel colours, more or less dense, are used for stippling and shading white or coloured pot metal; but if too thickly laid on at one time will be liable to crack off in a few years: several coats and frequent firing are necessary to produce permanency in the various dark shades. Examples of coloured enamel painting, by Backler, may be seen at Arundel Castle, the seat of the Duke of Norfolk. They are wholly enamel, and have no pot-metal colours; similar, also, to several glass paintings designed by West, and painted by Jervis, in the royal chapel at Windsor. These may be considered as simply semi-transparent pictures, wholly out of the category of what is generally known as stained or painted glass, by mosaic or grisaille treatment for ecclesiastical purposes. Referring to former explanations on the striated gelatinous colours, called

antique, used since 1851, as they were then shadowed out by Mr. Winston, and since produced by him and adopted by many of our English artists, but as yet feebly followed by Continental painters, it is somewhat remarkable, that while clearness of metal constitutes the greatest improvement in flint glass, the reverse should be the case for window glass; in fact, that while homogeneity should be the essential property of flint glass, impurity is equally necessary for the successful imitation of the ancient glass, in attaining the same depth of colouring, and the absorption of the rays to be found in the coloured glass of the thirteenth century: it, therefore, seems anomalous that the inferior fuel, for melting the materials, also that the metals, sand, and alkali possessed by the ancients, which were less pure than those used by the moderns, should have furnished greenish white, and pot-metal coloured glass, so exactly suited to produce the best effects for pictorial windows. Resuming our remarks upon enamel painting, there was the brown painted smear, and stipple shading, also a darker enamel for lines and shadows by hatching, or repetition of lines, serving as shadow upon white or pot-metal colours. There are several methods of shading, some being smooth, employed in early examples, and the latter being darker, employed in the grisaille of larger works. It may be asked, Does the grotesque style of the past age harmonize with our present mode of thought? How far does the present Exhibition, considering the present advanced state of the fine arts, meet the requirements of the nineteenth century? We reply, it is the contrast between 1851 and 1862 that affirms the fact, that in most of the English exhibitors, and several of the foreign, the art of glass painting has advanced with the times both in style and artistic execution. It is, however, much to be regretted that few of the windows can fairly be seen to advantage, owing to too much interior light, and the exterior borrowed lights of the present building being so inferior. Continental glass artists generally adhered to the early grotesque style in imitation of the past age; and in that respect, in 1851, were superior to the English; and, with the exception of the beautiful windows painted by Bertini and his school, that style is still retained. Bertini's windows in 1851 and 1862 may be classed in the mixed style of the old mosaic, and the enamelled style of the nineteenth century. The excellence in design and execution of the former was generally admitted, although insufficient transparency was occasioned by the too great opacity of the principal central figure. The "Madonna and Child" of Bertini, of 1862, may be considered as one of the gems of this Exhibition. The art of glass painting should have a special mode of treatment, impressed upon it by the nature of the material, as oil for canvas, and fresco for ceilings and walls. Glass being the medium through which the light passes, transparency must be its condition: different degrees of transparency are admissible; but when a large portion of the glass is so opaque as almost wholly to preclude the transmission of the rays, an essential condition is infringed. The style of the sixteenth century, or earlier periods, modified by the taste and feeling of the nineteenth century, should be supported by our designers and glass painters. With good original designs, improved antique glass, judiciously leaded, with a proper degree of transparency, first-rate drawing, good shadows, and well-arranged colours, forming, as a whole, a work of art, rich, harmonious, and impressive, patrons will not be wanting for the decoration of our ecclesiastical or domestic buildings. No doubt artists are influenced considerably by their patrons, each of whom may have his settled convictions as to style, &c. We should, however, endeavour to preserve the beauties and avoid the defects of the drawing of earlier ages; but no reason exists, why, as pottery, carving, statuary, and the fine arts have generally advanced, glass painting should be impeded or restricted in its progress towards the perfection of the art.

THE HASTINGS PIER AND HARBOUR SCHEME.

The scheme for a pier and harbour for Hastings has from the first met with a great deal of opposition. The whole affair has been pushed along in Hastings in such an unbusiness-like fashion, that many who would have otherwise supported the scheme have disdained to countenance a speculation that has, we might say, been forced upon the inhabitants by a party of interested individuals. The subject has been taken up rather warmly by the town-council; but the result of these debates may be easily conceived when we learn that several influential members of the council have been the nominal promoters of the harbour scheme, and when these gentlemen gave their vote in favour of their *own* scheme, all opposition in that quarter was of course out of the question. The opponents of the *harbour* do not oppose the construction of a *pier*. They consider that the latter would be a highly useful addition as well as an attractive feature to the town. They raise many objections to the proposed harbour, and particularly to the plan brought forward by the promoters of the scheme now before the public. The insufficient depth of water at the entrance, and the want of an inner basin, are perhaps the leading engineering objections; but they have made many other objections, none of which—as far as we are aware—have been answered by the promoters. Had a fair opportunity been offered for the expression of public opinion on both sides, all *appearance of unfairness* would have been removed, and no room left to assert that "party spirit and private interest had clashed with the public business of the town-council." The reported proceedings of the council meeting (of Friday last) show that when the overruling majority gave their sanction for a lease of such corporation land as would be required for harbour purposes, the beaten minority at least defended their principles, and stood their ground to the last. We will give no opinion as to the merits or demerits of the proposed scheme: no doubt there is a great deal to be said in favour of a "pier and harbour," and also much truth in what has been stated on the other side. The construction of such a work must increase and develop the trade of the locality; but whether such a change will or will not damage Hastings and St. Leonard's-on-Sea as fashionable resorts for visitors, we cannot attempt to prophesy.

THE STEPHENSON MONUMENT INAUGURATED.

At Newcastle-upon-Tyne, on the 2nd instant, the monument to George Stephenson, by Mr. Lough, was inaugurated in presence of many thousands of people, both townsmen, and others from all parts of the country. Lord Ravensworth, whose father was the early friend of George Stephenson, delivered the inaugural address, and handed the monument over from the subscribers to the mayor and corporation of the town.

The monument, which we have before described, consists of a statue, 11 feet in height, upon a massive pedestal 30 feet high. The figure appears in the Northumbrian plaid, which Stephenson was wont to wear, and the ordinary frock coat and trousers. At the corners of the pedestal are four subsidiary and emblematical figures, representing a blacksmith, a platelayer, a pitman carrying the famous "Geordie" lamp, and an engine-driver. It is a fine work.

There was a great demonstration of the workmen of Messrs. R. Stephenson & Co., and the other factories and trades of the town and district, with the Odd Fellows, Foresters, and other clubs, and the day was held as a general holiday. A long procession, consisting of the executive committee, and chairman and directors of the North-Eastern and local railways, the mayor and corporate bodies of the towns on the Tyne and in the locality, with the gentlemen, personal friends and relatives of the deceased engineer, members of Parliament and foreign consuls, were present at the inauguration.

CHURCH-BUILDING NEWS.

Wandsworth.—The foundation-stone of a new Baptist chapel has been laid at East-hill, Wandsworth. Mr. James Cubitt is the architect, and Messrs. Adamson & Sons are the contractors. The cost of the building is estimated at 2,100*l*. It will accommodate about 700 persons; and, when the fund will enable the congregation to erect galleries, 1,000. The architecture is a modification of the Romanesque style. There will be no pulpit, but the preacher will have a platform similar to that in Mr. Spurgeon's Tabernacle, with a baptistery underneath.

Fenton (Staffordshire).—Within the last few years, extensive improvements, additions, and alterations, more particularly in the interior, have been made to Fenton Church, at the sole cost of Mr. William Baker. During the last and present year, the interior has been further embellished by the construction of a reredos across the eastern end; that in the chancel being carved, and consisting of six arches in alabaster, supported on columns of foreign marbles; those in the side aisles being continued in Caen stone, but of plainer character, and consisting of five arches on each side, supported on columns of native marble, resting on stone seats. The panels in the reredos of the chancel are filled in with fine Sheffield stone, for illumination. The fittings consist of two ranges of oak stalls on each side with standards and poppy-heads, and the fronts of open tracery. The floor is being relaid with Minton & Co.'s encaustic tiles; and the chancel arch has been remodelled with carved Bath stone capitals, on columns of red serpentine marble. On each side the chancel window are two carved niches of Bath stone with marble columns, and these as well as the organ and reredos are being illuminated by Mr. Skidmore, of Coventry. It having been decided to furnish the church with a new organ, the vestry was taken down, and a new wing projected from the north side as a sort of transept has been erected to serve as vestry and organ-room together, opening into the church by a large open arch, executed in Bath stone with carved capitals, and supported by clustered columns of French (emperor's red) and green serpentine marbles. The churchyard is being enlarged by land given by Mr. Baker. The works have been executed from the designs and under the superintendence of Messrs. Ward, Son, & Ford, of Hanley, architects; the carving by Mr. Gladwin, of Stoke; and the other works by Mr. J. Oakley, of Fenton.

Northampton.—The chief stone of a new building, intended as a cathedral church for the Roman Catholics of Northampton, has been laid. The church is not altogether a new erection, being more properly described as an enlargement of the present Church of St. Felix, on the Kingsthorpe-road. The new cathedral, which is built at the west end of the old church, is 86 feet long by 56 feet wide; the whole length of the cathedral, including the apse, being 150 feet. The new part consists of nave, with clerestory windows, and two aisles, one on each side; and the entrance will be through the east-end wall of the old church. The altar, therefore, instead of being at the east end of the church, as usual in this country, will be at the west end, as in the case of St. Peter's, at Rome.

Leicester.—The alterations lately made at St. Martin's Church are nearly completed. The work has been done from designs furnished by Mr. R. Brandon, of London, architect, the whole being carried out under the superintendence of Mr. W. Lindley, who has officiated as clerk of the works. Messrs. Dove, Brothers, of London, were the contractors for the alterations; which, when finished, will cost something like 3,500*l*. Messrs. Gregson & Hind have executed all the stone carving in the alterations. In pulling down the old tower many curiosities were brought to light. It was found to be composed of several periods of architecture, Saxon and Norman work having been used in its construction. Some old stone coffins had evidently been built in the walls and used as quoins at the angle of the tower; while some carved sepulchral crosses were discovered, forming the arch stones of the belfry windows. On getting down to the foundations they were found to consist of nothing but a mass of rubble and granite, as it were thrown indiscriminately into a hole, without being bedded down with mortar or any other kind of cement. The new tower is Early English in character, with Coxbench stone dressings and Matlock Moor walling stones. A singular optical illusion is observable in the arch facing the nave: the two shafts starting from the abacus of the capitals until they come in conjunction with the Tudor arch above, although duly upright, appear to be 3 or 4 inches each out of perpendicular. It was found necessary in the erection of the tower to tie the new work with the old walls, and it is said that the new work has given no more signs of settlement or shrinking than an eighth or sixteenth part of an inch, notwithstanding the immense weight it has to carry—something like 14,000 tons. The tower is covered with a roofing of a very temporary character, in the hope that, at no distant period, a spire will be erected, in accordance with Mr. Brandon's original design. The north transept and the turret to the ringing chamber are of a mixed style of architecture, being partly of the Early English, Decorated, and Perpendicular periods. The roof of this part is Perpendicular, as well as the mouldings. The window is a Decorated one, while the pinnacle on the buttress, and the bell turret, are Early English. The window of the north transept, which has four trefoil-headed lights, is now filled in with rough cathedral plate glass of a greenish tint. Three of the south clerestory windows have been supplied with stained glass. A new oaken roof has been put to the south transept, which has been

raised several feet. Internally the edifice, in regard to its fitting up, has received a due share of attention, the walls having been coloured, and various parts renovated.

Loughborough.—The parish church of All Saints has been reopened. The restoration was commenced on the 19th of July, 1860, under the superintendence of Mr. G. G. Scott. The contract for the restoration of the nave, aisles, and church interior and exterior, and refixing, exclusive of heating, lighting, &c., were taken by Mr. Hall, of Derby, for 7,200*l.* The contract for the tower, which is now in progress, was 1,000*l.* The old galleries, which occupied the north and south-west end of the church, and blocked up the western windows, have been removed, as also have the old high pews. The foundations round the church have been underpinned with brickwork, and cement laid upon a wide bed of concrete. The masonry, both of the exterior and interior, has been restored. The windows to the clerestory and aisles and transepts have had the old brick mullions taken out and filled in with new stone tracery. The doorways, which were all plastered with cement, have been rebuilt in the original detail. The porch at the south entrance of the church is almost wholly new. The buttresses and parapets, the aisles and chancel, and the battlements and pinnacles to the clerestory, are new. The old east window of the chancel has been replaced with a window of the thirteenth century. The pillar and arches between nave and aisles have been restored. The pillar at the south-east angles of south transept, which was considerably out of the perpendicular, has been taken down and rebuilt. The roofs of nave, aisle, and transepts have been restored. The old low-pitch roof of chancel has been removed, and a new high-pitch roof substituted. The interior of the chancel roof is carved in compartments, with vertical and horizontal mouldings, divided into squares, each square being dissected with diagonal ribs and carved bosses. The whole of the roof has been covered with new lead. The seating to the church is of oak, all open benches. The warming of the church was undertaken by Messrs. Haden; the lighting by Mr. Skidmore. The whole of the church has been covered with a layer of concrete. The floors to the aisles and passages are laid with Minton's red and black encaustic tiles. The floor of the church is covered with single Minton's encaustic tiles. The carving was executed by Mr. Irving, of Leicester. The organ has been reconstructed in the north aisle, and improved, at a cost of 190*l.*, by Messrs. Lloyd & Dudgeon, of Nottingham.

Lullington (*Derbyshire*).—All Saints' Church, Lullington, has been restored and reopened. The tower and spire were in a most dilapidated state. This has been restored throughout at an expense of 525*l.* The gallery which blocked up the tower has been removed, and the tower arch thrown open; thus exposing to view the restoration of an old west window. In digging for new foundations, traces of a former chancel and aisles were discovered, which served as a guide for the erection of the new building. The seats in the nave are of English oak, as are also the choir seats. The floor is laid throughout with Minton's tiles. The whole work of restoration, which has cost upwards of 2,000*l.*, was carried out by Mr. J. W. Hugall, architect, and Messrs. Elliott & Lilley, builders.

Sudbrooke.—The new church at Sudbrooke has been consecrated. The church is erected on the old site; extending, however, a little further to the east; and is built of native walling stone from the Nettleham quarries; the inside being lined with bricks. The whole of the dressings, inside and out, are of Ancaster stone. The church consists of nave, chancel, and semicircular apse. The nave is lighted by three windows on the north side, two on the south, and four at the west end. The roof, which is open-timbered, stained and varnished, plastered between the rafters, and slightly coloured, is covered with plain blue Staffordshire tiles. The west gable is surmounted with a bell gable, in which hangs a small bell cast by Mears, of London. The chancel is lighted by two windows on the south, and two on the north sides. The ceiling of the chancel is plastered on a semicircular arch, the roof of which is hidden from view. The apse is semicircular, and is lighted with three windows looking east: the ceiling is groined in stone. The whole of the inside walls are plastered in rough stucco. The flooring of the nave and chancel, together with the steps, is of Yorkshire stone: the apse is paved with Minton's plain and mosaic tiles. All the windows are glazed with cathedral glass; but it is intended to remove the glass from the apse windows, and replace it with painted glass, by Messrs. Ward & Hughes, of London. The churchyard has been enclosed on the south, east, and north sides, with a low white brick wall, covered with a half-round Yorkshire stone coping. The church has been erected by Mr. W. Huddleston, of Lincoln, builder, and has occupied a little over six months in building. The cost, including the architect's commission, will absorb the whole of the 1,800*l.* Mr. B. Asman, of Lincoln, was clerk of the works. Mr. J. E. Dobson, of Newcastle-upon-Tyne, was the architect. The men employed in the erection of the church were treated to supper (the second during the progress of the work) by Mrs. Ellison, of Sudbrooke Holme, whose late husband, Mr. R. Ellison, bequeathed the fund for the erection of the church.

SCHOOL-BUILDING NEWS.

Headley.—The Hon. Mrs. Howard, of Ashtead Park, has recently caused to be erected in the parish of Headley, Surrey, a building for a new school, which has been opened. The building, which was commenced at the end of February or beginning of March last, has been erected entirely by the workmen of the hon. lady, under the superintendence of Mr. Milne, her steward. It is built entirely of yellow bricks, made on the estate, with red brick facings. The school stands on a quarter of an acre of ground, and is calculated to accommodate about seventy scholars. It is entered from the south side by a porch 8 feet by 11, which has a pointed roof. The dimensions of the main school-room are 27 feet by 18, with no ceiling, the roof sloping upwards, exposing the polished spruce boarding and rafters. The greatest height of the room is 26 feet, and the smallest, at the side walls, 12 feet. It is lighted by two tiers of windows; the lower tier being in the side walls and the other just above in the roof. The class-room, which is entered by a door on the east side of the main school-room, is 12 feet by 18, and of the same height as the school-room. It is lighted by four windows, two large ones and two small, and the walls are plastered.

PRINCE CONSORT MEMORIALS.

Coventry.—The inhabitants of this city have decided upon placing in the north aisle of St. Michael's Church a memorial window, the window selected being one of a series intended to be filled with stained glass. The subject illustrated will be the life of Moses. The heraldic devices of the late Prince and family will also be inserted. Messrs. Heaton, Butler, & Bayne are the artists selected.

Chester.—The same firm have in hand a large east window for St. Peter's Church, Chester, as a memorial to the late Prince.

Banbury.—The Albert memorial window, to be erected in Christ Church, Banbury, has been intrusted to Mr. T. Dury, of Warwick.

Belfast.—The fund to erect a memorial to the late Prince Consort, at Belfast, amounts to nearly 2,000*l.* At a recent meeting of the committee a plan was submitted of a clock tower, which could be erected for 1,800*l.*

THE FEVER AT ROTHERHAM.

We regret to learn that the fever still rages at Rotherham. In a letter of date 30th ultimo, to the chairman of the local board of health, Dr. E. J. Shearman, the officer of health, says:—

"I have great pleasure in reporting the decrease in the number of cases of fever in Masborough and Kimberworth during the last fortnight; but fear a similar improvement has not taken place in Rotherham; for there have been 57 cases attended at the dispensary in that period; and, from the 1st July to the 30th September—three months—there have been 536 cases admitted into that institution, and about 100 casual cases relieved.

The population of Rotherham and Kimberworth (including Masborough), as returned by the Registrar-General in 1861, was 18,922, and it is not more at present.

The general mortality in Rotherham, Masborough, and Kimberworth, in July and August last, has been 44 in 1,000; and for fever alone, 22 in 1,000. This is one of the highest rates of mortality which has occurred in this country. It is an isolated occurrence; and I beg most respectfully to call your board's most serious attention to the circumstance."

The medical officer then proceeds to point attention to True Briton-yard, Westgate, where fever prevails, and which place he characterizes as one of the most filthy in the district; and also to Barker's-yard, where there are water-closets without water. He adds that the more he examines into individual cases, the more convinced he feels that want of water, want of cleanliness, and want of ventilation, are the main causes of the fearful malady which prevails.

The board were divided in their remarks on this letter; some of them reflecting on the inspectors, and others insinuating exaggeration on the part of the medical officer. The surveyor's opinion as to closet cisterns was said to be that they were large enough already.

In connexion with this subject, a correspondent, once a resident at Rotherham, but now in the West Indies, writes us thence, saying:—

"Do, pray, Mr. Editor, send your special commissioner down, and let us have the origin of these epidemics traced out, and a remedy applied so far as the knowledge and power of man can afford one. A medical gentleman has been sent down by the central authority; but these persons are too often misled, or do not devote that time to a general investigation that the necessities of the case demand; and in this case I am satisfied that a searching inquiry is required to bring everything to light. It is a hard case when a man is fighting his country's battles abroad, and endeavouring to extend her fame and commerce, that those he has left behind, in whom he has centred all his hopes and cherished in his heart of hearts, should be annoyed and exposed to the ignorance, incompetence, carelessness, or indifference of those who ought to feel it a matter of pride to be their bulwark and protectors. Pray send a discerning commissioner to take a few notes, and apply your graphic and caustic pen to these plague-spots, and I doubt not but the blessings of health will follow, and the district will gratefully acknowledge your kind exertion."

PROGRESS OF THE MAIN-DRAINAGE WORKS.

At the meeting of the Metropolitan Board of Works held last week, Mr. Bazalgette presented the following report, showing the progress of the main-drainage works:—

"The main-drainage works are progressing satisfactorily. On the middle level sewer Messrs. Brassey & Co. have constructed about six miles 3,720 feet of sewers, ranging in size from 4 feet 6 inches, 3 feet, to 12 feet by 9 feet 6 inches, at a probable cost of about 165,000*l.*; of which 150,000*l.* has been done during the past two months. On Mr. Turner's contract for the northern outfall sewer, the whole of the concrete embankment extending from the river Lea to East Ham Church, a distance of four miles, is now completed. The substructure and foundation for the remaining length of sewers, from East Ham Church to the river Thames, is also completed. About nine miles 2,040 feet of double and treble lines of sewer, 9 feet by 9 feet, have been built; and the earth embankment over the same is being rapidly pushed forward. The outlet into the Thames, near Barking-creek, has been commenced, and is fast progressing. The iron bridges have not progressed with equal rapidity, owing to some delay with the parties furnishing the iron-work. The amount of work executed is estimated at 428,140*l.*; of which about 78,000*l.* has been done during the past two months. Mr. Welsher has made a vigorous commencement on the Southern outfall works at Crossness, and has brought upon the ground a large amount of plant. About 30,000 cube yards of excavation have been excavated. At the Deptford Pumping station, under Messrs. Aird's contract, the engine and boiler houses are being slated; the chimney-shaft, coal-sheds, sewers, pens-lock chambers, &c., are finished, and the river-wall is about three-fourths completed. Messrs. Slaughter & Co. have got in the boilers and most of the pumps, the lifting beams, &c. Work to the value of about 93,000*l.* has been done at Messrs. Aird's contract, of which about 7,000*l.* has been executed since my last monthly report. On the southern level, Messrs. Lee & Bowles have completed works to the value of about 184,000*l.* Their work is being carried on actively at Church-street, Deptford; Hanover-street, Rye-lane; and in De Crespigny-road, Denmark-hill. There is every probability of the contract being completed in the course of the present year. On the southern high level extension, Mr. Pearson has completed about 1½ mile of sewer, to the value of 8,500*l.* At the Effra sewer, Brixton, Mr. Webster has done about 1,600 feet, to the value of about 3,200*l.* On the low level sewer, Bermondsey branch, Messrs. Aird have been busy making preparations for commencing their contract, getting possession of the land, sinking deep sumps or wells for the drainage of the work. The Southwark new street was opened on the 28th of July last, between High-street and the Southwark-bridge-road, and is now being continued to Great Guildford-street. About 1,320 feet of subway, and 1,375 feet of sewer, have been constructed at a cost of about 22,000*l.*; being 2,000*l.* more than at the date of my last report. The borings for the Thames Embankment along the foreshore of the river between Westminster and Blackfriars-bridge will probably be completed before my next monthly report."

The Western Main Drainage Works will be proceeded with by Messrs. Moxon.

DEATH FROM ROTTING TIMBER.

The failure of a fir upright in the gymnasium of the Royal Naval School, New-cross, has caused the death of a pupil there, R. C. W. Helier Croker. At the inquest, Mr. Renton, a surveyor, who had superintended the erection of the gymnasium in the summer of 1858, gave evidence to the effect that it was constructed upon the same principle as the gymnasium at Primrose-hill; the uprights being morticed to the extent of 2½ inches into the lower part, which was 4 feet deep underground. The material used was Crown Dantzic timber; a piece of which, where the fracture took place which led to the accident, was produced; the core of the wood being completely decayed and rotten; the outer part still retaining its fibrous character. In his (witness's) opinion the decay of the wood had been occasioned through the rain finding its way into the

mortised portion of the upright; and, in answer to questions put by the jury, he stated that a fair price (95*l.*) was paid by the council of the school for the erection of the gymnasium; and that the Dantzic timber was the next best material to English oak; of which the Primrose-hill gymnasium was composed; being intended for the use of adults.

The jury returned a verdict of "Accidental death;" with a recommendation that, in the future construction of the gymnasium, English oak should be used, with beams of greater dimensions than those existing; and that the same should be subtected to periodical professional supervision.

CONSTRUCTION OF CHIMNEYS.

In reading the communication in a recent number on chimney construction, some of the errors in the present system of construction occurred to me. In the formation of a stack of chimneys, the most important features are generally least attended to. For example;—necessary thickness of work to the external (of detached buildings) or rain surface, so that the inner temperature of the flues may not be influenced by the outer, and so help to prevent checks; perfectly sound work in the division walls, particularly the gathering wings, where, after cutting, as is usual, the splay from the brick, it leaves seldom more than 3½ inches between them: added to this, the flues are generally smaller here than in the main, and not pargetted, being difficult to get at; and, as a finish, little attention is paid to the setting of the pot: the consequence is, the rain, running down the pot, through the inefficient setting, then trickles down the inside of the flue; and, in very little time, the moisture, with the soot, forms a spongy deposit to the pargetting: the wet and frost take out the pargetting and mortar joints of the division walls, and the whole of the exposed part of the chimney becomes a series of chambers full of interstices, influenced by every wind that blows and all moisture that falls. It is my opinion that where these particulars of construction are well and properly carried out, a great deal of the evil will be abated.

Many an incurable smoky chimney would be avoided if owners of property would but consult their architects, and not go on the "penny-wise and pound-foolish system." House-agents and speculative builders are *not architects*.

James H. Gates.

BACON'S AGREEMENT WITH CHAMBERS.

More than one correspondent ask, why, in the contract relating to Chambers and Bacon, some of the words "usual reduction of *two and a half per cent.*" were put in Italics? This was done to lead to inquiry as to the apparently curious clause. An explanation has been suggested,—that at that period there was some Act of Parliament, authorizing a collection to that amount from Government salaries and contracts; a sort of income-tax, in fact; and that it was not, as others have thought, a charge by Chambers as commission on the transaction. We will make some further inquiry.

BOOKS ON BELL-RINGING.*

Sir,—Your correspondent, Mr. Jephson, asks for a book on *Scientific Change Ringing*. I beg to inform him (through the medium of your journal) the best modern work on the subject is by Henry Hubbard, "late of the Society of Norwich Scholars," and published by Fletcher & Alexander, Norwich. There is also a useful little book for *beginners*, by the late Mr. W. T. Maunsell, published by Masters, Aldersgate-street.

If Mr. Jephson communicates with the parent Society of College Youths, who hold their meetings at the Yorkshire Grey, Park-street, Borough Market, he will, I am sure, obtain any information he may require on the matter.

A College Youth.

PAYMENT OF ARCHITECTS' ASSISTANTS.

Sir,—What should be the salary of an architect's assistant,—one fully competent to *assist* the principal in all branches of the profession,—one who has not only been educated, but has availed himself of every advantage within his reach, to enable him to carry out with tolerable success anything that may be entrusted to him, and to honestly entitle him to the designation of an architect and surveyor? I am induced to ask this question, as advertisements appear in your paper from week to week, both from assistants and architects requiring assistance, in which the salaries asked and offered are such that it is utterly impossible for any one who has had the privilege of enjoying that position which an architect's education necessitates to exist. It is my unfortunate lot to have been brought up to this profession; and now, at an age when most men have assumed a standing in society, I find I have not a sufficient connexion to justify me in beginning to practise for my own benefit; so that my only resource is in the remuneration I receive for my services as an assistant; and this is not more than a journeyman mechanic's wages. After the expense incurred in the education necessary to fit me for my duties, and the time I have spent in my studies, I ask, sir, is it fair that I should only be placed on a par with the mechanic, who earns his living from his childhood, and whose education costs nothing? Other professions are not in the same state: why, then, should the architect's assistant remain poverty-stricken? The attorney's clerk, versed in his profession, receives a more adequate reward for his labour; the skilful medical assistant is remunerated better: and even the non-resident teacher in a school, with not so much learning required as in our profession, receives more than the paltry pittance which is grudged to the architect. Mine is not a solitary case: there are hundreds who but leave the harassing toil of the office to be dunned by tax-collectors and creditors.

Z. P. S. Y.

* We depart from our practice in inserting this letter, knowledge of the books on the subject not being easily attainable.

HOUSES TO BURN.

"How long are Metropolitan Buildings to be reared as if, like laid fuel in fire grates, they were intended for setting fire to."—*Builder*, July 19, 1862.

Sir,—The above pertinent query, coupled with the deplorable loss of life at Cumberland-street, Hyde-park, and the Liverpool Workhouse, has aroused public attention to the alarming and unnecessary insecurity of our dwellings; and it will be well if the strictures of the press and the warnings of architects cause greater precautions to be taken against the recurrence of such disasters in future. Were it a matter of great difficulty or expense we should have perforce to submit to the calamity; but when the cost of a perfectly fire-proof flooring and stairs, with stone or iron, is so little beyond that of wood,—say an average of about one third,—it is clearly the duty, and, I believe, the interest, of all owners of house property, especially the managers of public institutions, to construct the floors and stairs of incombustible materials.

As the patentee of a system of hollow brick fire-proof floors, I have naturally given some attention to the subject, and shall be happy to give any information in my power to assist in the prevention of such catastrophes in future; and to that end am willing to allow the use of my patent, free of all royalty or profit of any kind, for buildings of a philanthropic character, asylums, workhouses, reformatories, &c.

J. Bunnett.

Deptford.

Books Received.

Simple Questions and Sanitary Facts, for the Use of the Poor: an Attempt to teach the simplest Natural Phenomena, and to explain the Functions and Structure of the Human Body. London: Tweedie, 337, Strand. 1862.

In the preface to this well-compiled and instructive little volume the author signs herself "An Irishwoman." She states that she fears the first part of her "little catechism," which is of an "extremely rudimental character," may be objected to; but that in the second portion she had deviated from her original intention, and entered on subjects which might not be considered necessary to those for whom she professes to write. Now, so far as regards ourselves, to neither of these modes of dealing with her subject would we feel inclined to object, *per se*; for she does her work well, and merits great praise; but in a "catechism" designed "for the use of the poor," it is a pity she did not restrict herself throughout to the more rudimentary mode of dealing with the whole subject; reserving the more extended mode of compilation for issue in a separate form. As it is, the poor might have had all the more essential information at a cheaper rate than 2s.; a price which is but too likely to deprive them of the benefit which the author is very capable of conferring on them.

The following quotations will give some idea of the author's more rudimentary matter:—

"Do you know an instance when death has occurred from overcrowding?

It is less than ten years since a fearful sacrifice of life occurred among the deck passengers on board an Irish steamer, who were ordered below by the captain on account of the badness of the weather. The hatches were closed on these unfortunates; and out of 150 no fewer than 70 died of suffocation before morning!

Was the captain punished for having occasioned this deplorable waste of life?

No; he was acquitted of all blame because he had only done what appeared to him best for the preservation of his passengers! The result being only the consequence of his astonishing ignorance of the fact, that men cannot live without having air to breathe! When I am blamed for dwelling too much on 'rudiments' in this little simple catechism, my answer will always be a reference to the fact now stated. I have only written to teach the first principles of life and health, and make it intelligible to every capacity that the air, which enters our lungs as *life*, leaves them as *poison*."

"What quantity of air does a full-grown person inhale?

I should be glad to write in letters of gold, in every household, that each individual inhales about fifty hogsheads of air in twenty-four hours; that is—we *spoil*, *vitiate*, and *destroy* this enormous quantity of atmospheric air in one day."

"How is the oxygen we inhale beneficial to our bodies?

It helps to build up the solid substance of the muscles, cartilages, and skin. It forms part of the material of which they are necessarily composed; and it is in this sense that oxygen is a real food; for to a certain extent we actually live on, and are fed by, the air which surrounds us."

VARIORUM.

"Patent Dock Gates. By R. A. Peacock, C.E., St. Helier, Jersey. London: Weale. 1862." The idea of the lock gates here described was taken from the firmly-fixed gate-post of an ordinary field-gate; and the design is to enable the gate to carry itself; thus obviating the necessity of using great hydraulic or manual power; so generally requisite with such gates. The patent, it appears, can be readily applied to existent dock gates, both cellular and wooden.——The October quarterly number of "The Popular Science Review" (Hardwicke) has been issued. It contains various interesting articles, by Lankester, Ansted, Breen, Buckman, and other known writers, with the usual reviews, summaries, &c.; and appears to sustain its character as a popular miscellany of entertaining and instructive articles on scientific subjects.

Miscellanea.

Window Cleaning.—A company for cleaning windows and shop-fronts has just been established at Vienna, says *Galignani*. Newly-invented machines will be made use of to prevent the accidents which so frequently occur. The price for cleaning each window is fixed at the low rate of one kreutzer and a half (about four centimes).

A London Permanent Exhibition.—A prospectus has been issued of the Universal Club and Permanent Exposition Company, with a capital of 100,000*l.*, in shares of 5*l.* each. The proposal is to establish a permanent mart in London for the exhibition of samples, patterns, and models; and to secure for the purpose certain premises in Cannon-street which are considered to be peculiarly eligible.

Zostera Marina.—Messrs. Koning & Co., of Texel, Holland, write that *Zostera marina* has been dealt in by them for some time; that it grows extensively on the Zuyder Zee; and that the collecting of it gives employment to many poor people. The grass is cut twice a year; and the extraction of the fibrous parts for manufacturing purposes must be effected on the coast. Some traders in this country have been in the habit of obtaining the plant from the Baltic.

Iron Casting in America.—Speaking of a recent casting made in Liverpool, and called "gigantic" in the English newspapers, the *Journal of the Franklin Institute* says:—"In a mechanical point of view, the casting of a similar piece at the Port Richmond Iron Works, on July 1st, shows a much greater capacity for doing this description of heavy work. The block weighs 31 tons, and to pour it 37½ tons of metal were melted in *one cupola* in four hours from the time the blast was put on. The quantity of air used in the blast was 4,000 cubic feet per minute. The coal consumed was one pound for each nine pounds of iron melted. The mould was filled in 4½ minutes pouring. The work was done with the ordinary resources of the establishment, and without any display or assemblage of visitors.

Brighton.—The Brighton Art Society has brought together an agreeable collection of pictures, from three to four hundred in number, some of them very good specimens. "The Brighton and Sussex Art-Union" has been established under good auspices, with a subscription of 10s. to assist in spreading these pictures abroad.——Endeavours have been made for some time past to induce the inhabitants to adopt the Public Libraries and Museums Act. A public meeting was held last week to consider the subject, when Alderman Burrows moved a resolution for the adoption of the Act; but his arguments were met by the greatest clamour and uproar, so that scarcely anything of his speech could be heard. Mr. Joseph Ellis (Bedford Hotel) and other gentlemen opposed the motion; and, after two hours of the most stormy proceedings, the mayor put the question, when only about a dozen hands appeared in favour of the motion. The contrary was put amid much enthusiasm, the meeting rising *en masse*, waving hats, umbrellas, and even chairs over their heads. A local paper says, naively, "Apart from the noise and clamour and hard words, there was not the least disturbance, and the meeting seemed influenced more by personal motives than by general principles." We should think so too: enlarged and enlightened views are greatly wanting in the governing body at Brighton.

The New Railway Station at Stockport. The pile of buildings erected by the London and North-Western Railway Company, for a station at Edgeley, is rapidly approaching completion.

Dangers of Engineers Abroad. — With reference to the disordered state of parts of Italy, it is said three of the English engineers of Messrs. Waring, Brothers, Brassey, & Co., constructors of the Southern Railway (Eboli branch), were seized by the brigands at the end of September, in the neighbourhood of Laviano, and carried off to the mountains, where they will have to be heavily ransomed. The engineers have been subjected to great ill treatment.

The Islington Reformatory.—The foundation-stone of a new structure for the Islington Reformatory, in Copenhagen-street, was laid last week, with the usual ceremony, by Sir J. Tyler. The main building is of brick, 100 feet long by 40 feet wide, with an elevation of 36 feet, the basement being divided into a series of reformatory workshops, and the upper story into one large ragged school, capable of holding 400 children, there being already 380 on the books. There are two playgrounds; and a separate building set apart for dining-rooms, dormitories, lavatories, and infirmaries. The architect is Mr. Higgins, and the builder Mr. Wheen. The estimated cost is 2,100*l.*

New Jetty at Devonport Dockyard.—An addition has been made to the "Anchor Wharf" in what is called a jetty, which, however, does not extend itself into the harbour at right angles from the face of the Anchor Wharf, but runs parallel with that erection. The jetty is 350 feet long and 40 feet wide, and stands on a row of cast-iron piles. At the average height of spring tides there is 40 feet of water at the new coaling jetty, so that the largest steam-ships at present employed by the British Government may approach it without grounding. The work was designed and has been constructed by Mr. H. Grissell, of London. Mr. G. Scott, manager at Davenport for Mr. Grissell, personally superintended the work.

Pneumatic Despatch.—The engines, boilers, discs, and other apparatus connected with this experiment in subterranean transit have been removed from their temporary site at Battersea to the Euston station of the London and North-Western Railway; the pneumatic 48-inch tube having been already laid down between that station and the whole length of Seymour-street; leaving a comparatively short distance to be completed along the end of Oakley-square and Crawley-street to the north-west district post-office in Eversholt-street; and it is expected that the entire apparatus will be ready for working in about a month. The engine will be worked at the Euston station and at Camden, to which latter point the tube will be extended for the collection, loading, and distribution of small goods and parcels, which it is expected may be transmitted at the rate of fifteen miles an hour. The Post-office have promised to use the tube on its completion.

Another Marshland Sluice Destroyed.—The outfall sluice of the Marshland Smeeth and Fen drain, an important arterial drain running into the Ouse, about 200 or 300 yards northward of the ruined Middle Level sluice, has become the subject of an accident precisely similar to that which destroyed the last-named work on the 4th of May. The result has been again to flood a portion of the Fen country, including some of the identical lands which were drowned by the bursting of the Middle Level banks, and only within the last few weeks reclaimed and brought into cultivation. The flood has also run through the culverts under the Middle Level drain; has again drowned some of the land in Broad and Short fens; and threatens Bardolph and Stow fens. At a meeting of the Marshland Smeeth and Fen Commissioners since the new accident, Sir John Rennie and Mr. Murray, C.E. (who had been making investigations in connexion with the pending suits against the Middle Level Commissioners), were called in; and under their advice the banks on both sides are being extensively raised: a dam of sheet piling is to be made about a mile and a half up the drain (just below the junction sluice between it and the Marshland sewer), and a permanent dam is to be struck at about 100 yards above the broken sluice. The Smeeth and Fen sluice (the subject of the accident) was built, and the drain itself excavated, in 1832, under the direction of Sir John Rennie; Mr. Dyson being, we believe, the builder. The still erect position of the sluice under the circumstances described is considered a proof that its foundations and brickwork are of very great strength. Its weak point is that of every such work,—the junction of the masonry with the earthwork.

Improvement in Rolling Iron, &c.—There is now in course of erection at the Dowlais Iron Works, a self-acting blooming machine, for blooming railway iron, &c. It is expected to start in a few weeks; and, should it answer expectations, it will be the greatest improvement made since rolling commenced. Mr. Charles White, of the Taff Vale Rail Works, Glamorganshire, is the inventor and patentee.

The Liverpool Surveyor and the Free Library.—Mr. Picton, pursuant to notice, moved in the Town Council recently, "That a grant be made to the surveyor, in consideration of his professional services in the erection of the Free Public Library and Museum; and that it be referred to the Finance Committee to inquire into the subject, and report to the next meeting of the Council." An amended resolution, "That it be referred to the Finance Committee to consider and report as to the propriety of making the grant," was finally agreed to.

News from Guernsey.—The foundation stone of a new Church of England structure was laid some time back by Mrs. Slade, the lady of the Lieutenant-Governor of the island. This church is situate on the Rohais road. Most of the money for building it has been raised by subscription. The Messrs. de Putron are the contractors; and Mr. Duquemin, sen., is the mason. Considerable improvements are being made in the town parish. The badly-paved and disagreeable street known as the Bordage has undergone a complete transformation. From this street some new steps will lead to Tower Hill, and will replace the inconvenient and unsafe ones that formerly occupied their situation. The Hanois Lighthouse is nearly completed. No lives have been lost, happily, during its erection. The customary houses for the keepers when off duty have been built in proximity to the lighthouse, which is two miles from land.

Sales of Property. — At the Mart. — By Messrs. Edwin Fox & Bousfield—Freehold dwelling-house, No. 368, Rotherhithe-wall, let at 38*l.* per annum—sold for 505*l.* Freehold groundrent of 21*l.* per annum, secured upon Nos. 8 and 13, Triangle-place, Clapham — 430*l.* Freehold ground-rent of 47*l.* 5s. per annum, secured upon Nos. 8, 9, and 10, Paddington-green, let on lease for ninety-six years from 1832, rack rent, 300*l.* per annum — 1,300*l.* By Mr. Kirkman—Freehold residence, No. 1, Church-terrace, Lee, let at 70*l.* per annum—1,100*l.* At Garraway's. — By Messrs. Farebrother, Clark, & Lye — Freehold ground-rent of 2*l.* per annum, secured upon a residence at Erith—45*l.* Freehold dwelling-house, No. 4, Lessness-heath, Erith, let at 30*l.* per annum—350*l.* Freehold, a similar residence, No. 3, Lessness-heath — 350*l.* Freehold residence, No. 1, Lessness Park, let at 45*l.*—600*l.*

New Drinking Fountain in Dudley.—A new fountain, from a design by Messrs. Wells, Brothers, of London, has been erected in the market-place, and opened to the public. The basement consists of two Cornish granite steps, upon which rises a moulded pedestal with six columns, with enriched capitals, composed of the water-lily conventionally arranged. In the frieze of the cornice are masks of river gods. Above the cornice is the dome and ornamental finial, also composed of water-plants; and the whole is surmounted by a female figure, bearing upon her head a water-bottle. Upon the centre of the pedestal, surrounded by the columns, is placed a marble vase and plinth, with lions' heads, from which two streams of water are continually flowing. The design is of a temple form, 20 feet in height, the columns and pedestal being of Portland stone.

The Marple Viaduct.—The last arch of the Marple viaduct on the Hyde and Marple extension branch of the Manchester, Sheffield, and Lincolnshire Railway, has been keyed in. The first stone of the adjoining aqueduct was laid in May, 1793, and the structure was completed in May, 1800, having been seven years in construction. The aqueduct consists of three arches of 60 feet span each; its height from the bed of the river—the Goyt—being 97 feet; and it contains 8,000 cubic yards of masonry; whereas the viaduct has thirteen arches, of 50 feet span each; its height from the bed of the river being 135 feet, and the contents 18,000 cubic yards of masonry. It is constructed entirely of stone; and as the first stone was laid on the 24th September, 1861, the time occupied in the construction has been about twelve months. The work has been carried out from the plans and under the superintendence of Mr. J. G. Blackburne, of Oldham, the engineer for the line. The contractors are Messrs. Benton & Woodiwiss. The viaduct will be opened for traffic in two months.

Theatre Burnt in Belgium. — The new theatre at Namur, Belgium, which has been for some time past in progress, and which was on the eve of completion, has been destroyed by fire. The loss is estimated at about 200,000 francs (8,000*l.*). The general impression is that the fire was caused by lightning, a violent thunderstorm having visited the town at the time.

New Mode of Laying Street Dust. — A plan of getting rid of the dust without watering the carriage-way has been for some time in operation in Paris, in the Avenue des Champs-Elysées. It consists of sprinkling the road with chloride of calcium, which, being remarkable for its deliquescence, or power of absorbing moisture, soon becomes damp, and thereby prevents any dust from rising even in the hottest day. Chloride of calcium gives off no smell like chloride of lime, which is quite a different substance.

Ancient Paris.—A correspondent says,—The church of St. Leu and St. Gilles, one of the most ancient buildings in Paris, hitherto almost unknown except by the parishioners, in consequence of the old houses with which it was surrounded, is now brought to public view by the extension of the Boulevard de Sebastopol on the right bank of the Seine. This antique monument, rebuilt in the year 1322, was raised to the title of a parish church in 1617. In 1727, an architect, named Guillaume Guerin, repaired the belfry, which was ruinous.

Bridging the Channel.—*Mitchell's Steam Steam Shipping Journal* says a project for a railway ferry-boat from and to Dover and Calais will be shortly before the public. The ferry-boat is to be 3,000 feet in length, 100 feet beam, and draw but 5 feet of water. In the centre of the deck will be a covered iron tunnel, into which the carriages will steam, with goods and passengers, to be conveyed across the Channel with considerable rapidity. The speed is to be forty miles per hour. She will have rudders at both ends, and will never require to turn. Her build is to be that of a series of unsinkable tubes.

The Figure of the Earth.—A rather curious corollary on the work of Mr. Gumpach, of Jersey, lately noticed in the *Builder*, and on the correspondence which took place between him and Mr. Airy, the Astronomer Royal, has just transpired in the French Academy of Sciences; which, says *Galignani*, "has received a communication from Mr. Leverrier, on the determination of the longitude of Havre; in which the author, after commenting on the difficulties attending the operation, remarks that the latitude of a point on the earth's surface, determined by geodetic operations, often differs so considerably from those obtained by astronomical observations as to induce one to attribute them to the irregularity of the terrestrial spheroid. Hence Mr. Leverrier strongly recommends the remeasurement of the differences of longitude between the extremities of the earth's parallels, so necessary to the exact determination of the figure of our globe. We are here," adds *Galignani*, "forcibly reminded of Mr. de Gumpach's work, which we mentioned a few days ago; and we think that Mr. Leverrier's explicit admission of the ambiguity of the latitudes hitherto determined goes far to prove Mr. de Gumpach's arguments in favour of the prolate and not oblate figure of the terrestrial spheroid."

Plan for Ventilating Ships.—A trial, by order of the Lords of the Admiralty, is now being made on board the *St. Vincent* training-ship at Portsmouth, of a plan introduced to the notice of their Lordships by Mr. Phipson, C.E., of London, for ventilating the 'tween-decks of Her Majesty's ships of war. The apparatus consists of an air shaft or cylinder, 4½ feet 3 inches in diameter, continued in lengths from the upper to the lower decks. The first length from the upper deck, being made of sheet-iron, contains the fan, at a level with the ceiling of the main deck; and the remainder of the lengths between each deck are of sailcloth. The fan is worked from the main deck by a small two-horse power vertical engine. This fan consists of two blades, set at an angle of about 50 degrees, regulated by a spring placed on the spindle. Above the fan is placed a dial to indicate the amount of air supplied to the decks below. The amount supplied by the apparatus on board the *St. Vincent* is 508,000 cubic feet per hour. There is no perceptible draught, it is said, produced. So far the experiment on board the *St. Vincent* appears to have been successful; but the *St. Vincent* is not a seagoing or even an efficient war ship, being merely a harbour training-ship, with a free communication fore and aft her lower deck, and without the machinery, stokeholes, and compartments below of our iron ships.

Mr. Tite, M.P.—We understand that, having served the office of master of the Spectacle Makers' Company, Mr. Tite, on retiring, gave 1,000*l.* to the charitable funds, to establish pensions for widows of liverymen of the company.

Restoration of Monuments.—Mr. Richardson, of London, the sculptor, has been engaged to renovate the Burrell monuments in Cuckfield church. They range from the fifteenth century to works by Baun and Flaxman. The same artist restored the Temple Church Crusaders, and the mutilated Effigial tomb in Chichester Cathedral.

Edinburgh Architectural Association.—The opening meeting of the session 1862-63 of the Edinburgh Architectural Association was held on the 1st; Mr. R. T. Shiells, President of the Association, in the chair. Mr. J. M. Brydon, the hon. secretary, having read the minutes, several new members were proposed for ballot at next meeting. The chairman then delivered his inaugural address, in which he gave a *résumé* of the principal events in connexion with architecture during the past year. Professor Archer, he was glad to say, had consented to give them a lecture in the Industrial Museum on materials for building and manufacture. Mr. R. Anderson then gave a lecture on "The Domestic Architecture of France and Italy."

The New Sheriffs of London.—The inauguration dinner of the new sheriffs, Alderman James Clarke Lawrence and Mr. Hugh Jones, given at the Albion on the 3rd inst., was a sumptuous commencement of their duties. Mr. Under-Sheriff Mackrell and Mr. Under-Sheriff Farrar concurred in making the arrangements complete. About 150 gentlemen, including the Lord Mayor-elect, Sir G. Pollock, Sir C. W. Dilke, Mr. Fred. Doulton, M.P., Mr. Ex-Sheriff Hill, Alderman W. Lawrence, and many other well-known persons were present. The new sheriffs spoke efficiently: but the toasts were a little too exclusively of a civic character.

The Manchester Stonemasons' Strike.—We regret to say that the stonemasons of Manchester are still out on strike; not, as we have before stated, for increased wages, but against a supposed infringement of one of their by-laws. Their employers deny the existence of such a law; or, at any rate, deny that it is binding upon them; but between 500 and 600 men have forced themselves into idleness, thereby losing their wages and stopping important public works, such as the Assize Courts and the London-road Station, for the sake of it. It is said to have been a rule that stone should not be sent into a town ready worked, but must be worked on the spot. Determined not to be coerced, the employers have advertised that 700 or 800 stonemasons will find employment in Manchester, at 30s. per week.

Social Science in Belgium.—The *Social Science Review* of 4th October contains a full account of the proceedings at the Brussels International Congress for the Progress of Social Science; so that we may now have some idea of "the brilliancy of many of the debates" dependent on the superior arrangements of the Brussels people. Of the *fête* at the Hôtel de Ville it is said;—"If the pictorial result was less massive than that of our own *soirée* at Westminster Hall, it was more chaste and refined: it gave to the English visitor an idea of what could be done at Westminster if Belgian art prepared the *fête*." Our fellow countryman, however, who penned this complimentary paragraph, seems to have no idea of what could have been done at Westminster had *English art* prepared the *fête*. No art whatever, in fact, was called in; no expenditure in that direction having been contemplated.

A New Hotel for South Kensington.—A limited company is being formed, with a capital of 100,000*l.*, in 10*l.* shares, for the purchase of six mansions in Queen's Gate-terrace, Gore-road, South Kensington, to be converted into a first-class hotel and club, at an outlay of 62,000*l.*; the hotel to be fitted up for families, and contain a general coffee-room, reading-room, ladies' coffee-room, private sitting-rooms, and about 100 sleeping apartments, hot and cold baths, and billiard and smoking rooms. The club apartments will be separate. There will be three entrances; one for families, another for the club, and the third for the hotel. As there is no hotel in the same quarter, it is believed that the speculation will be a successful one. It is proposed to open the hotel by or before the 1st of May next. The company is named "The South Kensington Hotel Company (Limited)," and the secretary is Mr. James Knight; offices, 4, Victoria-street, Westminster. Lieutenant-General Sir James Outram is at the head of the list of patrons. Mr. C. J. Richardson is the architect.

The late Mr. James Walker, C.E.—We must content ourselves at the moment by announcing (with expressions of great regret) the death of Mr. James Walker, the engineer, which took place suddenly, on the 8th inst., at his house in Great George-street, Westminster,

The International Exhibition.—The following announcement has been issued by the Royal Commissioners:—"His Royal Highness the Prince of Wales, being anxious to mark his deep interest in the success of the International Exhibition, an enterprise which owed its origin to his beloved father, has, with the approbation of her Majesty, graciously undertaken to distribute the medals and certificates of honourable mention at a state ceremonial early in the year 1863, after the building has been cleared."

Architectural Society of Northampton. The annual public meeting of this society has been held at the Hall, in Gold-street. The High Sheriff was in the chair. The report for the year stated, with reference to the plans for labourers' cottages, that they had obtained the approbation not only of the committee, but of all the most practical cottage builders to whom they have been submitted. Mr. Sharp, of Dallington Hall, read a paper on "Roman Remains," chiefly with reference to the discoveries at Dallington; after which Mr. E. F. Law read a paper on "The Queen's Cross." It appears that the stone of which the Cross was originally built was of a kind totally distinct from that employed in the various restorations, every one of which can be distinctly traced by this difference in the material.

TENDERS

For porter's lodge, &c. at Locksbottom, Farnborough, Kent, for the Board of Guardians of the Bromley Union. Mr. F. F. Thorne, architect:—

Howden	£260 0 0
Wallbutton	245 0 0
Cook	236 10 0
Marsland & Son	230 0 0
Gill	229 0 0
Ledger	214 9 0
Francis & Son (accepted)	204 0 0

For new Kidbrooke sewers, for the Board of Works for the Plumstead district. Mr. F. F. Thorne, surveyor:—

Simms	£1,200 0 0
Pizzey	1,160 0 0
Johnson & Mallons	1,095 0 0
Richardson	1,085 0 0
Hawkins	999 0 0
Todd	960 0 0
Lewis	819 0 0
Williams & Street	778 0 0
Dowell	765 0 0
Pearson	753 0 0
Hollis	751 0 0
Pound	746 0 0
Rogers	725 0 0
Bull	679 0 0
Hartland & Bloomfield (accepted)	627 0 0
Sharon	600 0 0

For new brick bridge and approach roads, &c., over the Quaggy River, Blackheath, for the Board of Works for the Plumstead district. Mr. F. F. Thorne and Mr. T. C. Haworth, surveyors:—

Gardner	£2,790 0 0
Gooch	2,640 0 0
Pearson	2,560 0 0
Bennett	2,525 0 0
Walker	2,165 0 0
Bush	2,109 0 0
Sharon	1,890 0 0
Todd (accepted)	1,495 0 0

For new cottage at Chislehurst, Kent, for Mr. R. W. Lomes. Mr. F. F. Thorne, architect:—

Wallbutton	£362 0 0
Francis & Son	304 0 0
Marsland & Son	304 0 0
Cook (accepted)	290 0 0

For the Windmill Inn, Chislehurst. Mr. F. F. Thorne, architect:—

Pedlington	£817 5 0
Bond	799 0 0
Shilton	759 10 0
Francis & Son	745 0 0
Simms	700 0 0
Williams	687 5 0
Harwood	678 10 0
Bussey	658 0 0
Coleman	656 17 0
Egerton (accepted)	655 0 0

For cottages and shops, at Chislehurst. Mr. F. F. Thorne, architect:—

Bond	£1,708 0 0
Harwood	1,535 6 0
Simms	1,427 10 0
Shilton	1,390 0 0
Unwin	1,388 0 0
Williams	1,367 12 0
Bussey	1,291 10 0
Pedlington	1,279 7 0
Coleman	1,218 14 0
Egerton (accepted)	1,087 5 0

For the erection of new farm buildings, at Lolworth, Cambs., for Mr. Osborne Daintree. Mr. Hutchinson, architect:—

Witham	£905 0 0
Allison	872 0 0
Allin & Smith	850 0 0
Thackeray & Son	799 0 0
Bunting & Son	785 0 0

For cooking and hot-water apparatus, at the Stepney workhouse, Bromley. Mr. Henry Jarvis, architect:—

Truss	£2,110 0 0
Cottam & Co.	1,050 0 0
May	954 0 0
Benham & Son	950 0 0
Brown & Green	910 0 0
Waller	870 0 0
Frazer & Son	860 0 0
Glover	849 0 0
Bailey	797 0 0
Smith	789 0 0
Amies & Barford	575 0 0

For new buildings, Cold-bath-fields Prison. Mr. E. H. Pownall, architect:—

Ashton	£24,123 0 0
Hill & Co.	21,850 0 0
Ellis	21,140 0 0
Kirk	20,693 0 0
Taylor, jun.	20,073 0 0
Rowe	19,975 0 0
Sawyer	19,953 0 0
Palmer	19,761 0 0
Chinnock (accepted)	19,200 0 0
Earth-work and Concrete.	
Ellis (accepted)	£3,045 0 0

For proposed alterations at the White Swan, Commercial-road East. Mr. Charles Dunch, architect:—

Jacobs	£525 0 0
Wood, Brothers	510 0 0
Larke	507 0 0
Brown	489 0 0
Curtis (accepted)	485 0 0

For three houses and shops, at Notting-hill. Mr. Fuller, architect. Quantities supplied by Mr. Arthur W. Q. Nicoll:—

Taylor	£1,147 0 0
Carter	1,095 0 0
Williams	997 10 0
Howard	968 0 0

For the erection of a house for Mr. Bradshaw, 151, Church-street, Shoreditch. Mr. R. Parkinson, architect:—

Hardiman & Sandon	£500 0 0
Canon	449 0 0
Livermore	344 0 0

For the erection of manager's house and cottages, adjoining the gasworks, Aldershott. Messrs. Eggar & Stapley, architects:—

Birch	£870 10 0

For repairs to twenty houses, Vincent-square, Chapter-street, &c. Mr. James G. Smither, surveyor to the estate:—

J. & W. Sanders (accepted)	£722 0 0

For additional pensioners' residences at the Royal Medical Benevolent College, Epsom. Mr. George Elkington, architect:—

Andrews	£2,295 0 0
Hooker	2,252 0 0
Brown and Robinson	2,129 0 0
Hack & Son	2,077 0 0
Conder (accepted)	1,976 0 0

For alterations and additions to warehouses, Goswell-street. Mr. Hill, architect. Quantities supplied by Mr. Barnet:—

	No. 1 warehouse.	No. 2 warehouse.
Goslin	£467	£400
Gadsby	460	290
Timewell	445	278
Turner & Sons	436	342
Henshaw	374	286

For building additional wing to Middle House, Bolingbroke-grove, Wandsworth-common. Mr. G. H. Page, architect:—

Palmer	£1,498 0 0
Piper & Wheeler	1,460 0 0
King	1,425 0 0
Adamson & Sons	1,353 0 0
Bass	1,300 0 0

For cottages, Garrett-lane, Wandsworth. Mr. Page, architect:—

Bass	£660 0 0
Strong	600 0 0

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